IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication JUNE 1, 1961

George Kufrin

★ Hallicrafters' Halligan Tells How—

Quick Reaction Capability Gets the Job Done p. 47

What Steelmakers See Ahead p. 35

Soldering Goes Automatic p. 65

Digest of the Week p. 2-3

minute particles of lead...

improve surface finish

On these center aligning balls used in automotive universal joints, CHARLESTON METAL PRODUCTS switched from A.I.S.I. 52100 to the same grade of steel *leaded.** They now report improved surface finish . . . a 15% increase in tool life . . . more uniform tolerances in finished parts. They also note that wear and shock resistance are not affected and uniform high hardness (RC 62-63) is maintained. Distortion remains at a minimum.

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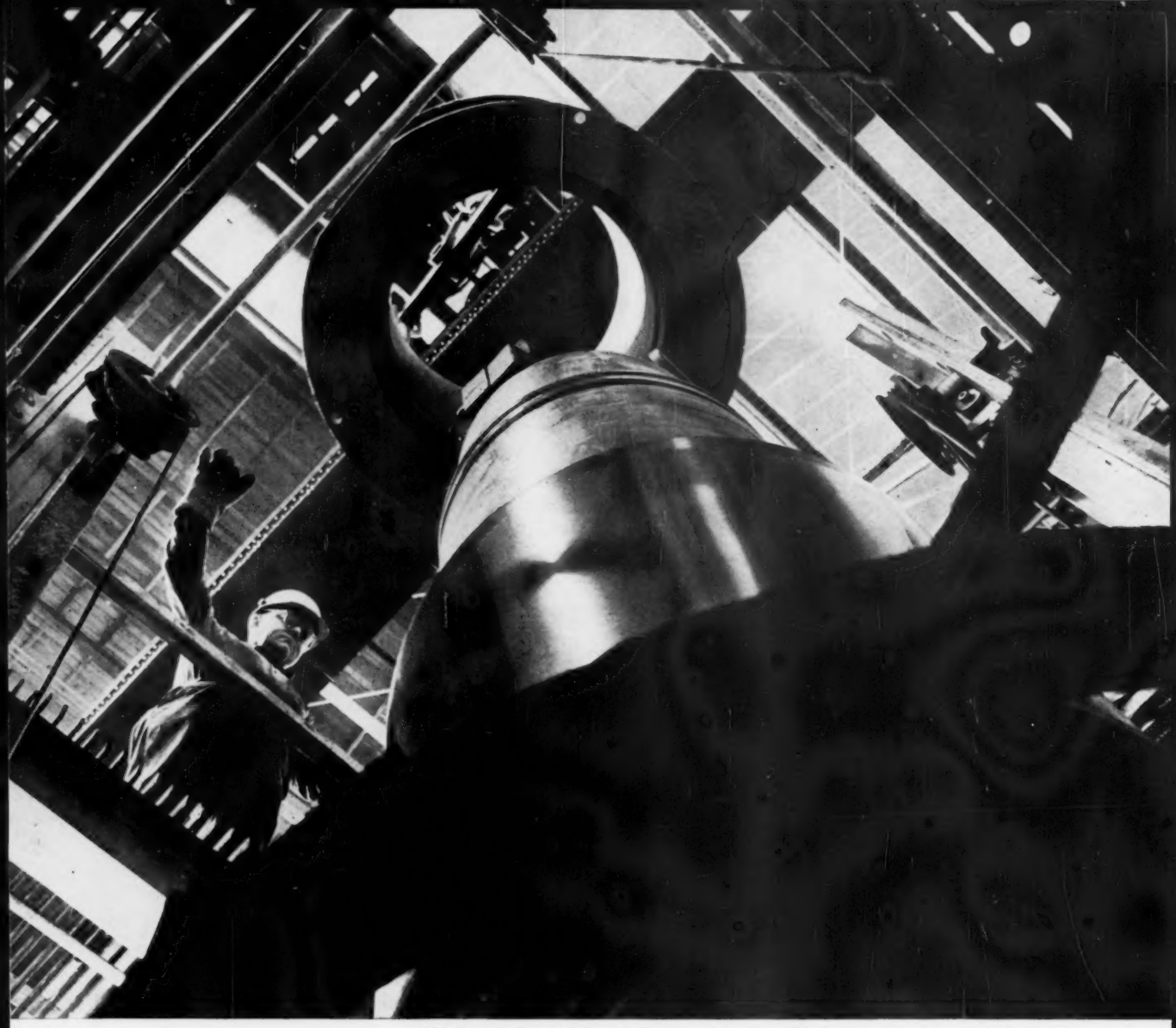

This forged alloy-steel sleeve is first heated to about 800 deg in order to expand its ID. Then it is lowered onto arbor, as shown. When the sleeve cools and contracts, it bites into arbor forming a tight fit.

Get more tonnage from back-up roll sleeves . . . make sure they're forged alloy steel

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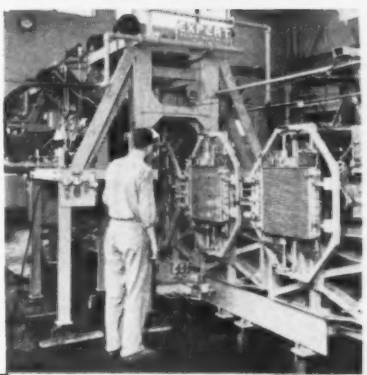
Special This Week

QRC: Shortcut to New Products

Industry is beginning to develop what it calls "Quick Reaction Capability"—a technique that slashes through red tape, squeezes years and months into weeks and days to speed development of new products. Hallicrafters' president Robert Halligan and others tell how it pays off in both defense and industrial fields. p. 47

AISI: What's Ahead for Steel

Steel executives report business is looking up for their industry. At general meeting of the American Iron and Steel Institute, Ben Fairless (left), presents the institute's award in operations to Allan B. Dove, The Steel Co. of Canada, Ltd. p. 35



High-Speed Units Solder Radiators

It takes several pounds of solder to leakproof a new automobile radiator. Until recently each sweat-soldered assembly called for 90 pct handwork. Automatic machines now perform this tedious work. These units improve quality, reduce costs. p. 65

Next Week

Can Small Businesses Survive?

Despite everything that's been said to the contrary, there still are plenty of small businesses—and opportunities for many more. Next week's cover story shows that manufacturing companies don't have to be big to make a go of it today.

150 OPENINGS BURNED IN HUGE CONTROL PANEL ASSEMBLY

Expert Ryerson flame-cutters had to exercise their greatest skill in cutting these openings with a degree of accuracy that would assure proper installation of a complex instrument system. Distortion had to be carefully controlled and a high degree of flatness maintained so that the plates would have a good appearance when painted. These exacting requirements were readily met by Ryerson.

How METALOGICS* cools off the high-cost hot seat!

Here are two examples of how Ryerson Metalogics helps hundreds of companies save money, improve their products and cut costs.

Metalogics-trained Ryerson specialists help you value-analyze high-cost production problems—and give you unbiased recommendations on exactly the right steel, aluminum or plastic, plus the best methods of fabrication, to do the job.

Little wonder, then, that more and more companies across the country find the high-cost hot seat a little cooler after inviting a Ryerson man to value-analyze specific problems and come up with recommendations. Is your company taking full advantage of this unique service?

*Metalogics—the Ryerson science of giving optimum value for every purchasing dollar.

SUGGESTION ELIMINATES THREAD GALLING

Manufacturer made this special coupling of aluminum to gain the advantages of light weight, corrosion resistance and easy machining. But galling of threads presented a problem.

Following the recommendation of a Ryerson Metalogics specialist, the company hard-coated the parts by special low-temperature anodizing, which produced a surface hardness of Rockwell 70 C. Galling was eliminated, and corrosion resistance increased. One more example of cost-cutting technical help from Ryerson.

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Treasury's Plan: Man, What A Crazy Quilt!

Whoever concocted the Treasury's latest tax plan will go down in history. But where he will go is another matter.

The so-called "help" to industry for depreciation has been attacked by every expert in the business.

Those whom it should help would get a droplet —if that. The current depreciation plan is a far cry from those submitted after years of patient and constructive work by industry tax authorities and past and present Treasury people.

Then comes the big crackdown on so-called expense account spending. An amateur psychologist would know at once that this is punitive and symbolic rather than sensible.

To be sure, there are people who overdo this phase of the tax gambit. But the Internal Revenue Service ought to do its own work in ferreting out these cases. If the law upholds the taxpayer—as it has done—that is the way it should be. This attempt to rush through an unrealistic and punitive law smells. It is a little too cagey—and that is being kind to the plan.

But even if there is some kind of a legal strong-arm law placed on expense accounts and entertainment, there's more infantile stuff in the tax plan.

When government suggests a change in taxes, the so-called low man on the totem pole is subtly stirred up against the so-called big shot. That is dirty pool. It ill befits a government which gets its wherewithal from all classes of citizens.

The plan to withhold bank interest and dividends is a travesty on our oldsters. The cold-blooded way this is being pushed is a back stab at our elders—people whom the Treasury often says it wants to help. What about the millions of older people who will have interest and dividends withheld and sent to the Treasury? What will happen?

A lot of people who do not understand the tax law (and who does?) will lose their money. The bureaucratic setup which will be spawned to collect the withholdings of interest and dividends will not worry about the people entitled to a refund. The government is interested only in getting the money—nothing more.

A crazy quilt? Man, it sure is!

Tom Campbell

Editor-in-Chief

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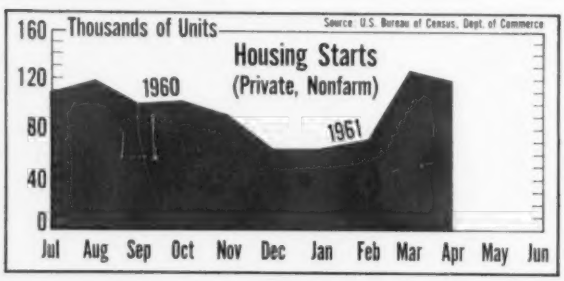
Nobody Wants To Buy Houses

Private non-farm housing starts in April were at a seasonally adjusted annual rate of 1.2 million units. This is down 6 pct from the March rate, and 8 pct off the rate of April of last year. Actually, 112,000 units were started in April this year compared to 103,000 in March. April had three less working days.

The housing lag in the face of the general recovery has economists beating the bushes for reasons. Mort-



gage money is in easy supply, interest rates have been lowered, and almost 40 pct of all households are renters or "doubling up."

Everything needed for more new housing sales is present—except demand. This is the challenge to builders and building materials men. Look for them to stimulate demand through greater housing values. And for housing starts to bump along to higher levels soon.

Recovery Is Now Official

Short of a direct statement by President Kennedy, the recovery has now been declared official. The May issue of the Commerce Dept.'s Survey of Current Business uses the term, "clear signs of recovery."

The survey also calls the pickup in durable goods orders as "noteworthy."

Will Recovery Bring Inflation?

Will inflation be riding the tail of the recovery? A run-through with economists and executives at the recent National Industrial Conference Board meeting gives a consensus response of "yes, but moderate."

Economist and Administration consultant, J. J. O'Leary, hit a middle road with his own conclusions. First, he summed up, there will be no deflation. With the huge volume of private and public debt piled up in the last 15 years, deflation would be "politically inconceivable."

Other "up" forces: Expansionary pressures due to government efforts to assure growth and full employment. And steady rise in cost of services.

But foreign competition, and fear of resultant gold outflow, will moderate the "up" forces.

GNP Bottoms; Rise To Follow

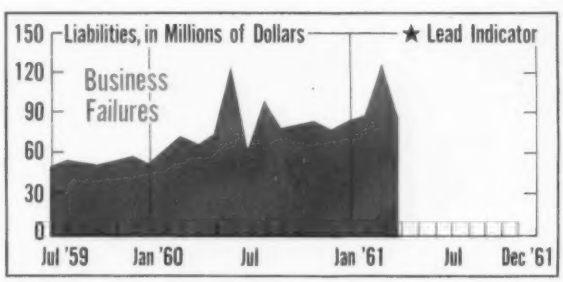
Gross National Product in the first quarter dropped below the magic half-trillion dollar mark for the first time since the 1st quarter of 1959. GNP hit a seasonally adjusted annual rate of $499.8 billion in first quarter this year, 1 pct off the 1960 final quarter.

A key in the GNP drop from the last quarter of 1960 was a $4 billion drop in durable goods buying by consumers. The same key, in reverse, will be the big spark in setting GNP on the road back up in the second quarter. Durable goods are making one of the best responses in the present recovery.

Business Mortality Eases

Fewer businesses failed in April than in any month since last December. Some 1450 failures were counted in April, a 10 pct drop from March. Dollar liabilities of business failures dropped from $126.6 million in March to $86.1 million.

Failures in manufacturing ran higher in April in



iron and steel and construction categories. And more auto dealers went under in April than in March.

Better days ahead should stabilize the business failure rate near lower levels hit in April.

Construction Contracts Slip

Construction contracts in April showed a decline from year-ago levels, says F. W. Dodge Corp. April dollar volume of $3.3 billion was 2 pct below April 1960 volume.

Big cause of fall-off is termed, "extreme weakness in contracts for single-family houses." Added woe: Heavy engineering contracts off 5 pct to $800 million.

BIRDSBORO

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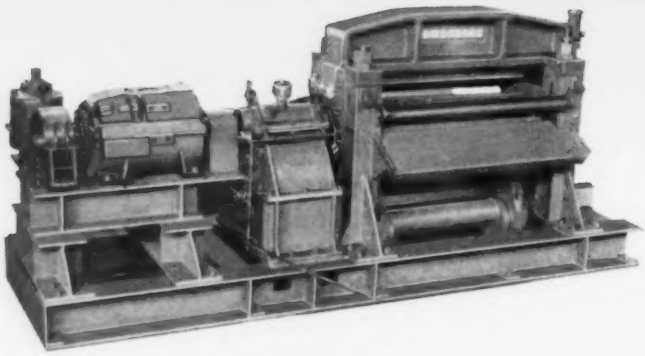
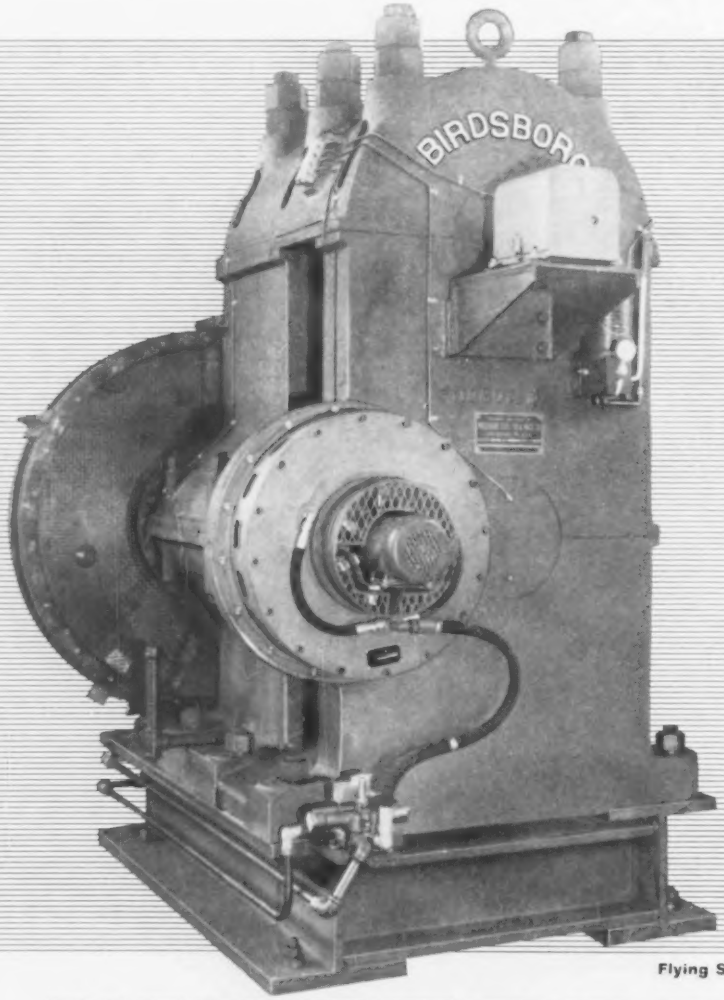


• Like any other key piece of mill equipment, shears have been given a lot of BIRDSBORO's attention in recent years. As a result, many innovations are available to the mill operator that can eliminate former problems and provide a finer product at a lower cost. BIRDSBORO's shear case history book is a full one. In it you can see a number of firsts, some of them applicable to your operation. The BIRDSBORO representative can help apply creative engineering to your mill. *Sales Department, Engineering Department and Mfg. Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.



Flying Shear by BIRDSBORO

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USWA: Will It Take Goldberg to the Wire?

By early next year, Secretary of Labor Arthur J. Goldberg will face his Waterloo.

As usual, there will be a hard hassle in steel that will go down to the line. Both sides have, in private at least, agreed that the last settlement was nothing more than a truce.

GOLDBERG: Waterloo in '62?

But Mr. Goldberg feels there is no need for a strike. If he has anything to say about it, plans will be made long before the deadline next year to head off a strike.

The theme will be that the U. S. can't afford a steel strike with foreign affairs in such a sad state. Also, there will be threats of White House pressure if a settlement isn't reached before a walkout.

The reaction? Probably the same as in the past: Down to the wire with Washington in the background.

Eventually, perhaps the next time, the Steelworkers and the steelmakers will come together with far more mutual understanding than has been the case for years.

Kennedy Asks to Curb Union Pension Abuses

President Kennedy has asked Congress to strengthen laws to prevent abuses of union welfare and pension funds. He says there are "serious deficiencies" in the present law.

A proposed new law would:

Give the Secretary of Labor stronger investigative and enforcement powers;

Make it a felony to embezzle welfare and pension funds or to be involved in kickbacks and payments to influence actions connected with fund operations;

Require that supporting records be kept for five years;

Call for detailed reports on financial operations of fund plans instead of only summaries.

Nearly 1 Million File For Extra Jobless Pay

Bureau of Employment reports that by mid-May some 942,000 persons had applied for benefits under the Temporary Extended Unemployment Compensation program which began in April. These are long-term unemployed who have exhausted regular unemployment compensation rights.

NLRB: Speedier Decisions?

President Kennedy's reorganization plan for the National Labor Relations Board was submitted to Congress last week.

In effect, it's a decentralization plan: The five-man board would become something like a "supreme court" for labor-management disputes. Lower-level officials, such as trial examiners, would be given decision-making powers now reserved solely for the five-man board in Washington.

Adoption of the plan would speed up final decisions from the N.L.R.B. At present, the time lag between filing of a complaint and handing down of the decision is often as much as a year.

Decisions handed down by lower-level officials would be considered final. However, they could be appealed to the national board for review. But the national board would only review cases where there is some new question of law, or if it feels some unusual circumstances dictate study by the national board.

Generally, the plan would work more to the advantage of unions than of companies. Unions file two out of every three complaints that go before the board. Many of the complaints deal with unfair labor practice charges growing out of organizing efforts.

Speedier hearings would give union organizers a chance to resume their efforts, providing the union won, before such a campaign were to lose all of its steam and the workers had cooled off. At present, long delays in arriving at decisions tend to work against the unions by giving management time to launch a counter-attack.

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★Price-Fixing: Whose Problem?

Senator Estes Kefauver, (D., Tenn.), seeks a law to pin the blame for antitrust violations on top executives of industry. Sen. Kefauver's legislation would send corporation presidents and board members to jail for negligence in permitting price-riggers to operate within their companies.

The legislation grew out of the price-fixing investigation in the electrical industry before the Senate Antitrust Subcommittee. It's just one of several new bills seeking to curb price-fixing and bid-rigging.

The other bills, soon to get Congressional attention, are:

1. A bill giving the Justice Dept. power to publicize identical bids received from industry by the government. This would put President Kennedy's recent Executive Order into law.

2. A bill to make identical prices prima facie evidence of collusion to violate antitrust laws, in some cases.

3. A bill giving judges discretionary power to bar from office for one year any company official convicted of antitrust law violation.

4. A bill providing for placement of an outsider on the board of directors of any company convicted of antitrust law violation.

5. A bill to increase maximum fines for antitrust violations from $50,000 to $100,000 and set three-to-six months as the minimum jail sentence.

These bills and Sen. Kefauver's "negligence" bill, will be given hearings soon before the Antitrust Subcommittee.

The Tennessee Senator believes his bill to blame top echelon executives for price-fixing is the best way to keep subordinates from meeting with competitors to fix prices or allocate markets.

■ Businessmen Attack Expense Clamp-Down

Business interests branded the Kennedy Administration's request for a clamp-down on expense account spending "unnecessary."

Spokesmen for business, appearing before the House Ways and Means Committee headed by Rep. Wilbur Mills, (D., Ark.), pointed out that new restrictions on business expense accounts were unnecessary because:

The Internal Revenue Service already has the power to curb expense account abuses.

Significant steps have been taken this year to widen audit coverage and enforce regulations governing deductions for business expenses.

The "ordinary and necessary" rule on business expenses is enough to determine what is a lawful deduction.

Spokesmen testified that any limitation on lawful deductions of "ordinary and necessary" expense would amount to "confiscation of property."

■ New Commerce Post Means Industry Help

The Assistant Secretary for Science and Technology sought by the Commerce Dept. would work on industry as well as government research projects.

The Assistant Secretary, a new post which has to be authorized by Congress, would work closely with those industries which are backward in research and development. According to Edward Gudeman, Under Secretary of Commerce, such industries as textiles and construction would be in line for help.

The Assistant Secretary also would be in charge of R&D efforts within the Commerce Dept. Projects of the National Bureau of Standards, Patent Office, Maritime Administration, Weather Bureau, Bureau of Public Roads, and Coast and Geodetic Survey would come under his direction.

■ Two Missiles Face Cost Comparison

The government is trying to end interservice disagreement over which weapons should be bought for defense of the U. S. The main battle is between the Navy's Polaris missile and the Air Force's Minuteman.

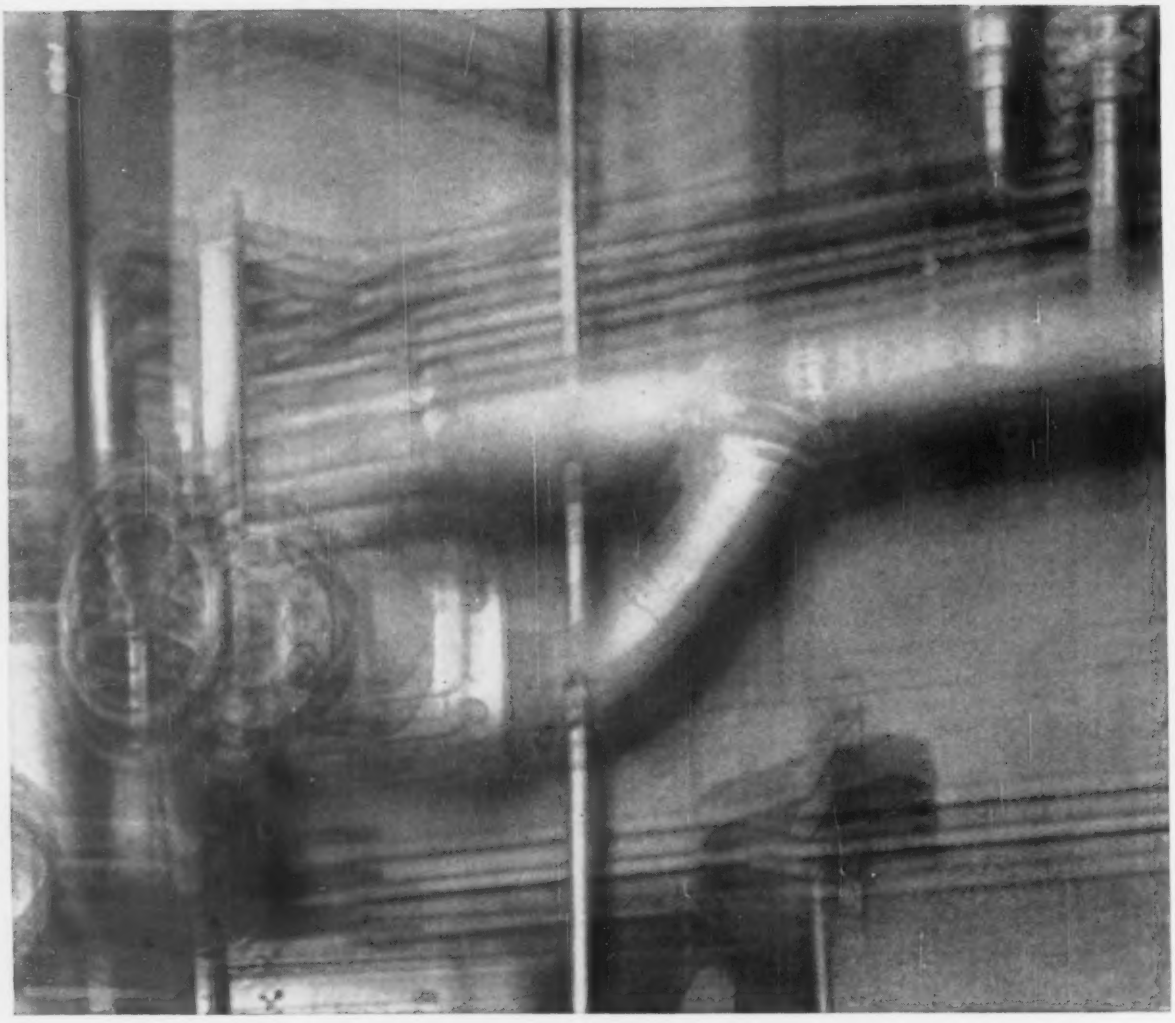
A budgetary method is suggested to stop the bickering and find which weapon is the most valuable. Budget-makers will evaluate both systems on the basis of their "cost-effectiveness."

Each weapon will be scored in an identical manner as to cost and effectiveness. It is recommended that the number of missiles bought be based on these scores.

■ FTC Pushes For Long-Term Ruling

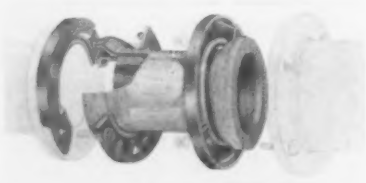
Can the Federal Trade Commission cite one illegal act by one company and bar the company and others from all similar acts in the future?

This question of illegal trade practices will be answered by the U. S. Supreme Court within the next year.



Tranquilizers for pipes that shake like this

HERE'S a sure cure for pipes that get rattled when the pressure's on. Install a B.F.Goodrich connector between the pipe and the pump. A connector is a short length of rubber hose used to join sections of pipeline. The soft, thick rubber absorbs vibrations. Cuts out banging and noise. Increases pump life, avoids costly broken connections.



In a midwest zinc plant, pipe on a hot acid line had to be replaced 2 or 3 times a year. Vibration from the pump shook the pipe until it banged, rattled, cracked. Then a short length of the lead pipe was replaced with a BFG Flexseal connector. Its cost $105. And it saved the customer $1000 in the first year alone by eliminating the cause of broken connections, frequent repairs, costly pipe replacements.

In addition to *Flexseal*, B.F.Goodrich has recently announced a new heavy-duty connector, called *Flexlock*, which is built to take working pressures up to 150 lbs. Both Flexseal and Flexlock are made with abrasion and acid-resisting rubber. Both provide full flow connections. Both can be ordered with or without wire reinforcement.

B.F.Goodrich distributors can give you complete details on B.F.Goodrich Flexseal and Flexlock connectors. And as factory-trained specialists in rubber products, they can answer your questions about any of the products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-123, Akron 18, Ohio.*

B.F.Goodrich

Latin American Aid Is Stepped-Up

The Kennedy Administration has launched its stepped-up foreign aid program for Latin America.

The President calls the program an "alliance for progress." Responsibility for administering the

RUSK: New responsibility.

program will fall upon the shoulders of Secretary of State Dean Rusk and the State Dept.

Fast action is expected on a number of Latin American development projects in the fields of education, training, and public health. International Cooperation Administration has been told to set $25 million as a minimum target for these projects this year. And the Export-Import Bank will accelerate projects it is already financing for Latin America.

Canada Steel Output Was High in 1960

Mid-1960 predictions by Canada's iron and steel men turned out to be pessimistic. Last year ended as the second best year in Canadian iron and steel history.

The momentum of the record year 1959 carried over into the first quarter of 1960 for steelmakers in Canada. But second quarter activity dropped off.

However, steel ingot production in 1960 totalled 5.7 million tons—only 124,000 tons short of the 1959 record. And pig iron and ferroalloy production last year in Canada exceeded 1959 levels.

Canadian producers are showing mixed feelings of hope and apprehension for 1961. Activity is now picking up and most predictions call for continued gains through the rest of the year.

GATT Talks Finally Reach Metal Products

Metalworking industries at last will learn what the long-awaited international tariff sessions in Geneva will mean to the price of metal products, imports and exports.

Member nations of the General Agreement on Trade and Tariffs (GATT) finally have started dickering for tariff adjustments on over 2000 trade goods including metal products. Talks should end before the year is over.

While U.S. proposals have been secret, it is known that some import duty cuts are being offered on metal items. This is to gain similar cuts for U.S. products abroad.

Mexican Trade Shows Small Gains

After a slow start at the beginning of the year, the Mexican trade picture is beginning to show signs of improvement. Figures for March, for example, show imports down slightly and exports up about three pct.

Among recent developments in the Mexican economy are these:

Fewer autos are being imported into Mexico for assembly. The Mexicans are preparing to begin their own auto production.

Mexico's steel producers say that country is on its way to becoming the largest steel producing nation in Latin America.

Arabia Gets Fully Cooled LPG Tanks

Arabian American Oil Co. is now building a $7 million plant in Saudi Arabia. And, when finished, it will be the world's first plant specifically designed to make fully refrigerated Liquefied Petroleum Gas available for tanker shipment.

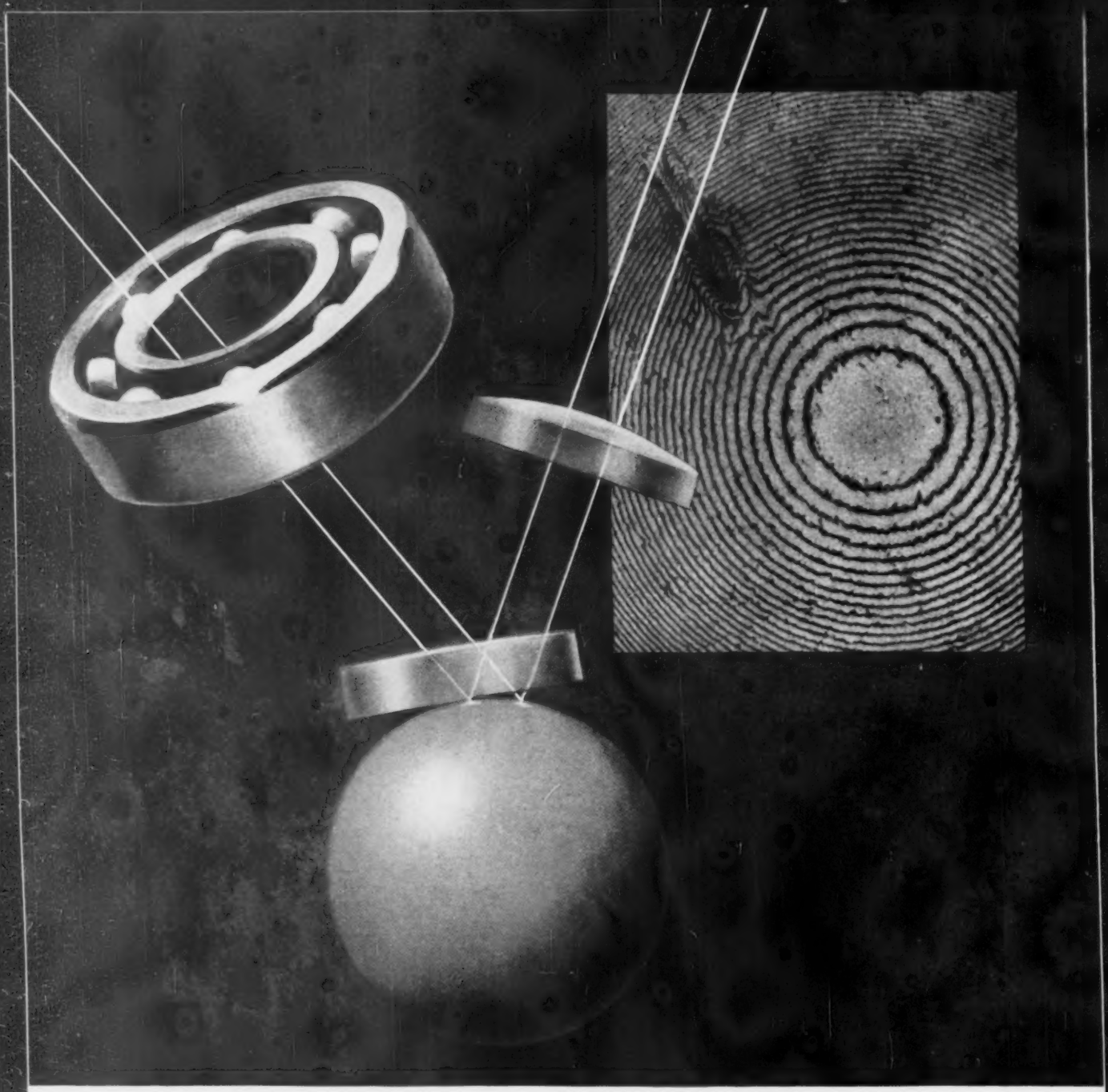
According to AAOC, the plant will supply 4000 barrels daily of high-purity propane, butane, or a blend of the two.

Technically, the plant is signifi-

AAOC: Economical pressure.

cant. With its new facilities, the company will be able to store pressurized gas economically. By refrigerating the storage tanks, pressure is lowered. Hence, the cost of tank construction has dropped considerably.

Piping and equipment at the facility is insulated with Pittsburgh Corning Corp.'s Foamglass shaded pipe covering.



SPLIT LIGHT BEAMS MEASURE IN MILLIONTHS

to help SKF build better bearings

SKF MOTION ENGINEERING

Advanced ball and roller bearing technology

The concentric pattern of interference fringes in the picture above is reproduced from an actual photo taken with the aid of an interferometer in the SKF laboratories. The subject under examination is a microscopic flaw in the surface of an accurately lapped steel ball. The principle of utilizing split beams of light to form interference patterns enables accurate measurements to be made in *millionths* of an inch.

SKF is a leader in the development and application of ultra-precise measuring systems. The SKF metrology laboratory plays an important part in a continuing program of research to produce bearings of improved accuracy and finish, and consequently, quieter, smoother running characteristics.

Whatever types of rolling contact bearings you need—ball, cylindrical roller, spherical roller, tapered roller or precision miniature—you'll find SKF your best assurance of dependable performance. SKF Industries Inc., Philadelphia 32, Pa. 6104

New products and technical advances offer twin springboards to higher profits. Nowhere was this more evident than at two major metalworking shows held last week. The Tool Engineer's Show drew big, enthusiastic crowds in New York City. Detroit's Cobo Hall played host to a well-received Design Engineering Show.

Air Reads Taped Signals

Pneumatic-hydraulic numerical controls made their debut last week. These new tape-reading systems can be adapted to most machining operations. Punched tapes are read with air; then the worktables are hydraulically positioned at speeds up to 700 ipm. Positioning accuracy with the non-electronic controls is ±0.0005 in. Advantages include low cost, easy maintenance.

Aluminum to Stainless

Strong, leakproof joints between stainless steel and aluminum are expected to offer advantages to designers of high-speed aircraft. Such brazed joints have been successfully performed by engineers at Bi-Braze Corp. The marriage of these dissimilar metals is expected to pave the way for greater use of transition joints.

Strong, Elastic Springs

Pound for pound, Du Pont's shock-absorbing Mylar provides three times as much spring action as steel. Each increase in the thickness of this polyester film cubes its stiffness rating. Springs made from lightweight, nonconductive Mylar films can be stretched up to 3 pct elongation and they'll still recover their original shapes. Copper and steel springs, on the other hand, are permanently deformed after 0.5 pct elongation.

Protects Tantalum Parts

On display at the Design Show were samples of specially-treated tantalum. These test samples withstood aggressive reducing environments such as boiling 85 pct sulphuric acid. Small pieces of platinum attached to the tantalum in an area ratio of 10,000:1 inhibit hydrogen embrittlement. A continuous coating isn't needed. Tantalum in contact with platinum also resists embrittlement in concentrated hydrochloric acid at 374°F.

Precision Sorting Unit

One of the hits at the ASTME Show was a prototype sorting machine. Using a single electric gage and a memory system, this machine monitors thickness readings along the entire length of a short metallic or nonmetallic strip. Gaging accuracy at a sorting speed of 2400 strips per hour is within 0.0005 in. With dual gages, the unit checks rod diameters and thicknesses.

Fast Structural Analysis

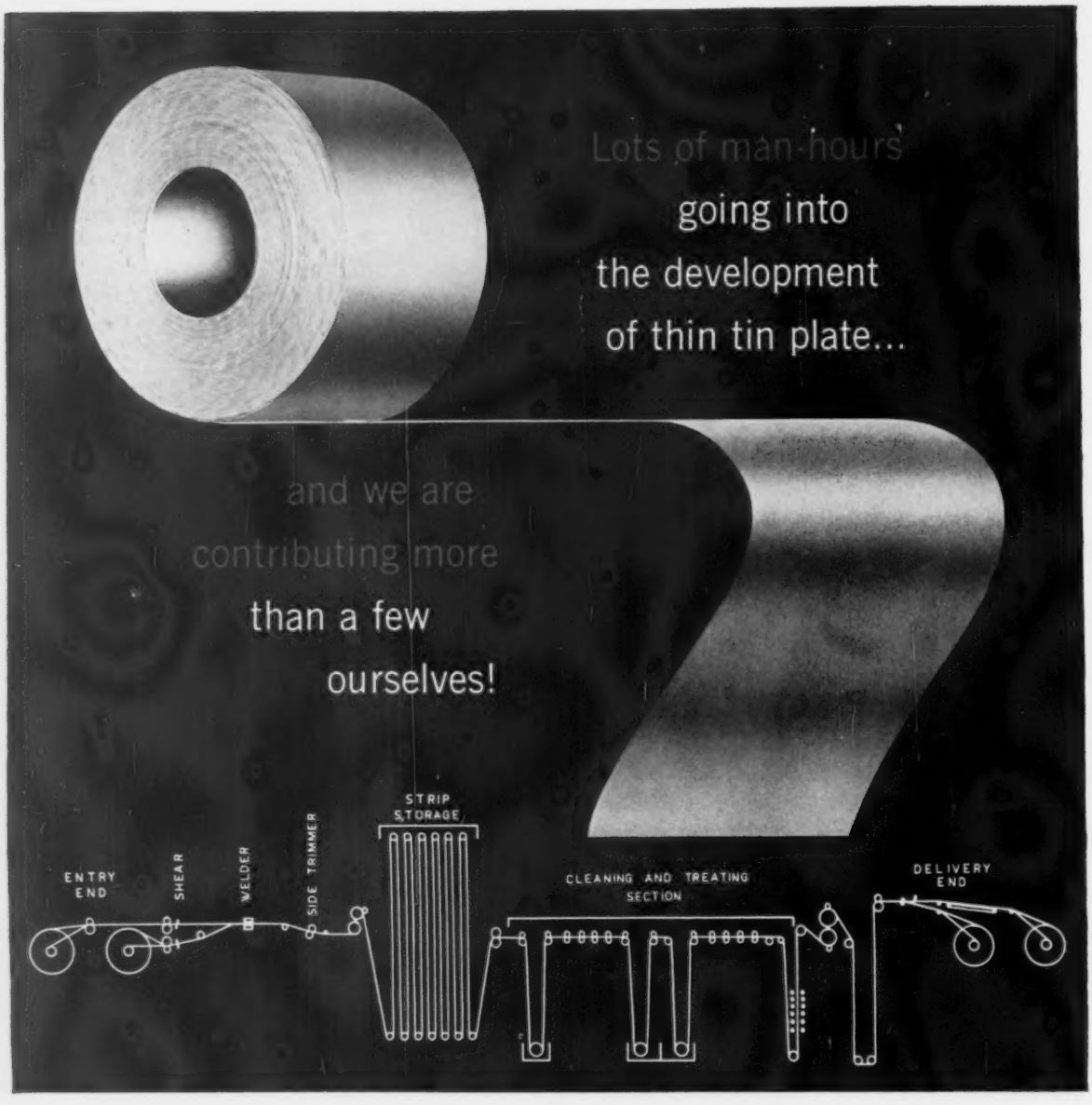
Dynamic analysis of complex 3-D structures can be completed within an hour by using four basic steps. A new system does the work that normally calls for a million computations or more. Thus months of engineering time are saved. The first step is to develop a mathematical model which duplicates the design structure. Engineers report: "This opens a door to more precise design and optimum material utilization."

Improves Rotary Grinding

Coordinating a variable table speed with a fixed wheel stroke, a Japanese-built rotary surface grinder drew lots of attention in New York's Coliseum. The velocity of the table gradually increases as the grinding wheel advances to the center of the work. End result is a constant, predetermined grinding speed at all times.

Tooling Weights Tumble

Use of aluminum-honeycomb materials in lieu of solid laminates yields a 75 pct reduction in plastic-tooling costs. The compressive strength of honeycomb stiffeners varies from 400-500 psi, depending on the aluminum's cell size. In one test, a laminated honeycomb-panel was subjected to a 1150-lb load for 500 hours. Initial deflection read 0.01325. Total creep stayed within 0.00525 in. Recovery after load was 100 pct.



The trend toward new products, with emphasis on lightness and strength, puts the night lights back to work.

Lots of man-hours are going into these developments, such as thin tin plate and light wall pipe and tubing. We are contributing more than a few ourselves. We should. We are a major supplier of equipment, and what's good for the industries we serve is good for us.

More important, we do have a lot of knowledge and experience to draw on. We have been building equipment for handling and processing sheet and strip, as well as bars, tubes and pipe for a good many years.

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Inspiring Message

Sir—Your May 4 editorial entitled "Freedom Is Dying: The Reds Are Killing It" was another fine example of your inspiring messages which should receive a much wider circulation.

You are to be congratulated on your incisive analysis of our present predicament and for your clarion call to arouse the people to action. I believe, however, that many of us are already awake to the danger and are ready for specific demands by our leadership which, thus far, have been slow in coming.

"Give us the tools and we will finish the job," once said a most venerated old statesman. So, too, must we ask our President for the tools and what we, as individuals, can do in this grave crisis.—S. W. Meyer, Koppers Co., Inc., Pittsburgh, Pa.

On Moonlighting

Sir—Your recent story on the International Assn. of Machinists worry about moonlighting (IA, Apr. 27, p. 9) shows that they've missed a basic point in economics.

The point is: The shorter the work week, the less a man produces. So costs go up. So prices go up. So the man who has "gained" the shorter work week takes a second job in order to meet the high cost of living. So there are big unemployment figures because so many men feel they need two jobs—while others have none.

I suspect that an accurate survey would show that most "second" jobs are at work that is far below the primary skill of the worker and that union moonlighters are contributing to unemployment by taking jobs that unskilled workers need.

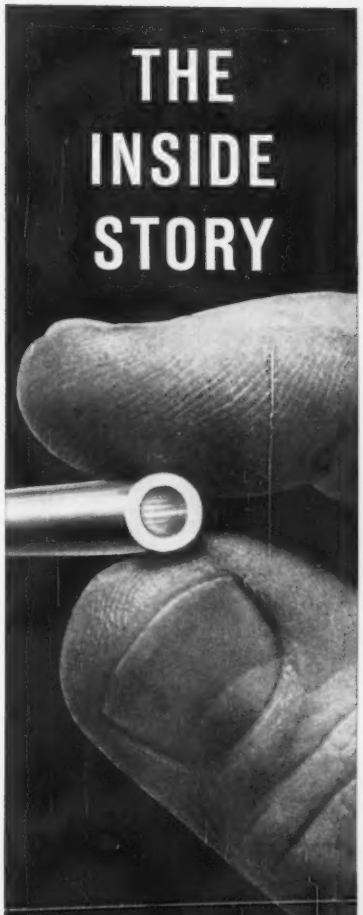
Let's face it. The "leisure time" permitted by a shorter work week is not going to mean that the worker will attend cultural activities, participate in sports, or even loaf. Because of the higher cost of living he has helped to create by cutting his output, he must take a second job to help meet expenses.—C. W. Metcalf, Sharon, Mass.

Vivid Picture

Sir—As a student of West Germany's economy, I have read with great interest E. C. Beaudet's recent article entitled "West Germany: Economy Booms, But Not Without Problems" (IA, May 18, p. 105). Mr. Beaudet has presented in this superbly written story a factual and vivid picture of West Germany's economic problems. His magnificent piece is one of the best I have read on that subject in a long, long time.

As an economist and writer, I know from my own experience how difficult it is to evaluate the economy of foreign countries as a result of a relatively short visit. In such cases, it happens very rarely that writers and foreign correspondents can accomplish completely and adequately their assignments. However, your Mr. Beaudet succeeded 100 pct. And I want to take this opportunity to congratulate The IRON AGE on this splendid coverage—an outstanding example of modern journalism.

West Germany has particular significance to me since already in 1947 I had subscribed to Prof. Ludwig Erhard's viewpoint (against the opposition of other leading American economists) that this country's free enterprise economy will rise again like a phoenix out of rubble and ashes. My observations appeared later in condensed form in the NEW YORK HERALD TRIBUNE where I coined for the first time the phrase "Prof. Ludwig Erhard, chief architect of West Germany's economic recovery."—Maurice Feldman, New York, N. Y.



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Posen & Kline produces Microdrawn® stainless steel and nickel alloy tubing up to ⅝" OD in every conceivable finish, shape, tolerance, and ID to solve your tubing problems . . . satisfy demanding tubing needs.

Facts in Catalog 10. Posen & Kline Tube Company, Inc., Box 549, Norristown, Pa.

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CRUCIBLE
where a fine finish is only the beginning

An Award for Tom

We were pleased to learn IRON AGE Editor-in-Chief Tom Campbell has been named to receive the National Management Association's award as "Free Enterprise Newswriter of the Year."

Together with John Mihalic, president of two divisions of Avco Corp., who was named the NMA's "Management Man of the Year," Tom will formally receive his award at the association's annual convention in October.

"Objective Reporting"—In making the awards, the NMA cited the two men for their "vigorous efforts to promote the free enterprise system." Tom Campbell was applauded for "inspiring vision, courage, and leadership among industrial executives through his objective reporting."

Among Tom's achievements, the NMA noted, was his recent series of editorials, "Our National Issues: What Do We Do About Them?" The association also pointed out his able coverage, for over 25 years, of the labor-management relations field.

Here and Overseas—Beyond the U. S., Tom has traveled, reported, and written about industry and business all over the globe.

Commenting on Tom's career the NMA observes, "In his 26 years as a reporter and editor, Campbell has brought a new dimension to business journalism. In the years immediately following World War II, for example, he was among the first to realize that new trends and ideas would have to be fully explored and evaluated by management people.

"For more than a decade, he has dealt forthrightly with the major issues confronting American industry—not from the narrow perspective of one company, but rather from industry, national, and international vantage points."

EDITOR OVERSEAS: You may recall this photograph (IA, Mar. 23, '61) of Tom Campbell, IRON AGE Editor-in-Chief (left), chatting in Tokyo with Earnest Hoberecht, United Press International's vice president and general manager for Asia, as Tom began his six-part series on Far East industry. The series helped him win the National Management Association's award as "Free Enterprise Newswriter of the Year."

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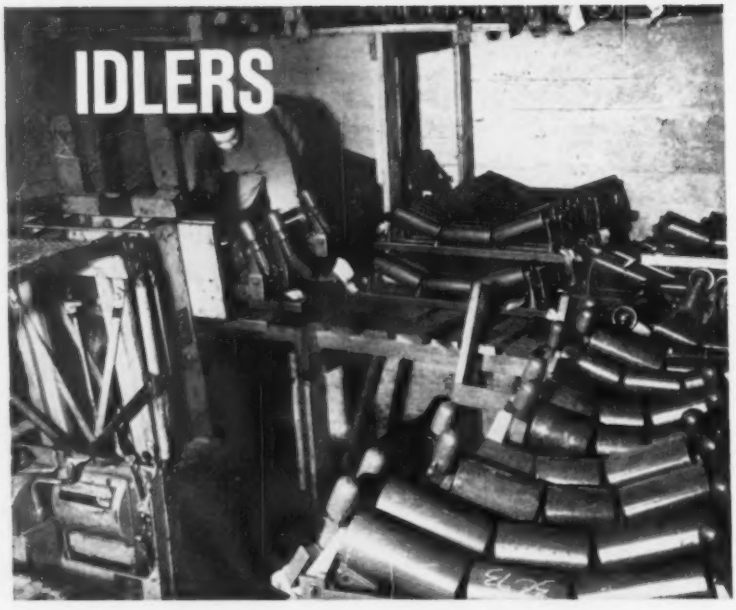

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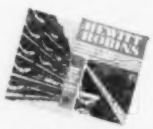
Write for bulletins
6-62 (Belt)
6-62 (Idlers)



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COMING EXHIBITS

Plastics Exposition—Ninth annual, June 5-9, New York Coliseum.

Instrument - Automation Show—June 5-8, Instrument Society of America, Royal York Hotel, Toronto, Canada.

MEETINGS

JUNE

American Gear Manufacturers Assn.—Annual meeting, June 4-7, The Homestead, Hot Springs, Va. Assn. headquarters, 1 Thomas Circle, Washington.

National Assn. of Purchasing Agents — Convention and show, June 4-7, Conrad Hilton Hotel, Chicago. Assn. headquarters, 11 Park Place, New York.

Institute of Appliance Manufacturers — Annual meeting, June 5-7, Netherland Hilton Hotel, Cincinnati. Institute headquarters, Shoreham Hotel, Washington, D. C.

Society of Automotive Engineers, Inc. — Summer meeting, June 5-9, Chase-Park Plaza Hotel, St. Louis.

Appalachian Underground Corrosion—Short course, June 6-8, West Virginia University, Morgantown, W. Va.

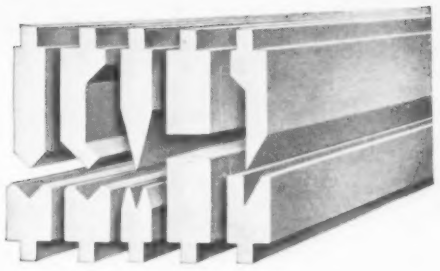
National Assn. of Secondary Material Industries, Inc.—Pacific Coast Div. regional meeting, June 8, Benjamin Franklin Hotel, Seattle, Wash.; Midwestern Div. regional meeting, June 15, Statler - Hilton Hotel, Cleveland.

Malleable Founders Society—Annual meeting, June 8-9, Broadmoor Hotel, Colorado Springs, Colo. Society headquarters, 781 Union Commerce Bldg., Cleveland.

Manufacturing Chemists Assn., Inc.—Annual meeting, June 8-10, The Greenbrier, White Sulphur Springs, W. Va. Assn. headquarters, 1825 Connecticut Ave. N.W., Washington 9, D. C.

(Continued on P. 24)

press brake tooling



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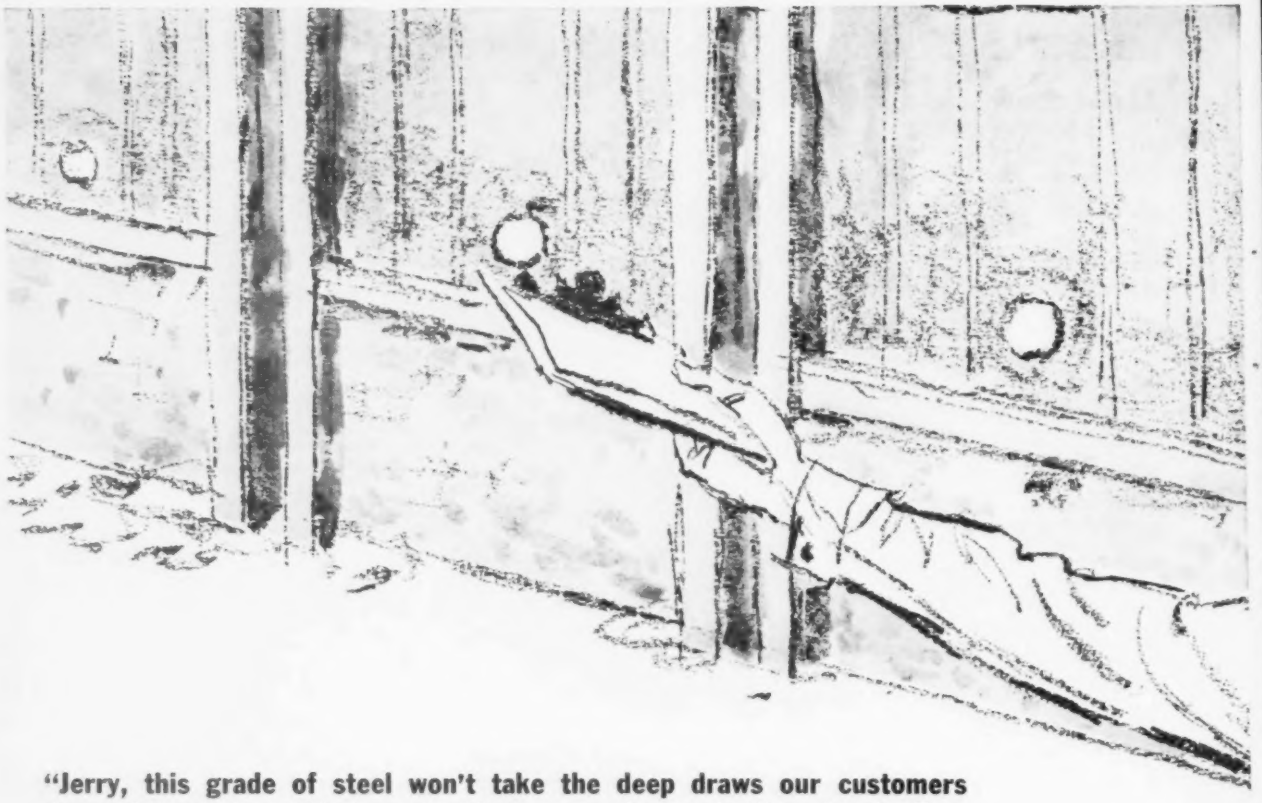

"Jerry, this grade of steel won't take the deep draws our customers demand these days. What we need is lower carbon and silicon levels. Ever used Electromanganese?"

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Almost perfect freedom from contaminants helps quality, starting with superior ductility. The big advantages here are improved annealing practices for you, better drawing characteristics for your customer.

And watch those reject rates go down. All along the way, quality goes up, costs drop. And that means after the steel is shipped, too. Returns will be fewer, breakage claims less.

We'd like the opportunity to demonstrate further what we say. Allow us to look at your specific problem with you—whether it's in aluminum-killed, rimming, free-machining or stainless steels. Write for Bulletin 201 which more fully explores advantages of Foote Electromanganese. Foote Mineral Company, 438-18 West Chelten Ave., Philadelphia 44, Pennsylvania .

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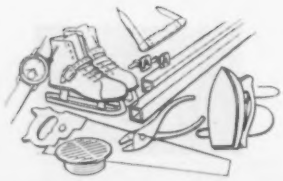

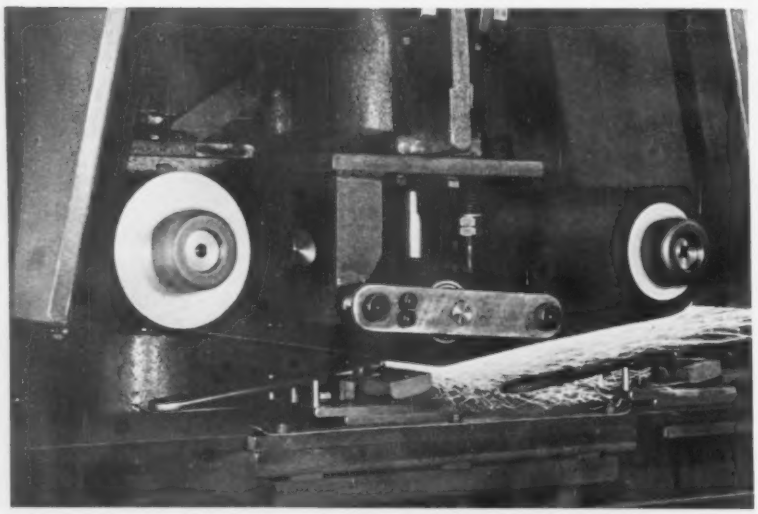

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Doing more work with *Movement and Motion*

Designing and building versatile finishing machines that do more work—better, faster, easier, and at lower cost—is a specialty at Acme. Has been, too, for over half a century.

Take the multiple-head flat surface finishing machine shown close-up in action above. It consists of standard Acme components, yet it can be used to perform a number of operations on a wide variety of parts. Deburr, grind, polish—buff or satin finish. All done automatically—in a single pass if desired. What's more, oscillating movement of the conveyor in motion prolongs useful life of abrasive belts and buffing wheels—assures greater uniformity of finish on every piece.

Range of models? Light and heavy duty machines—conveyor belt or pinch roll fed—available in sizes to accommodate your flat parts and products up to 74 inches in width!

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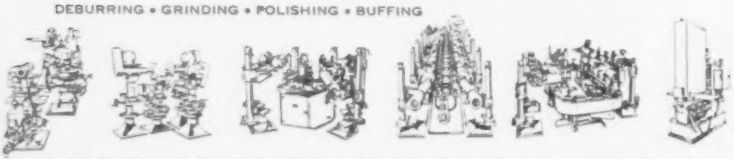

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MEETINGS

(Continued from P. 21)

Assn. of Industrial Advertisers—Annual conference, June 11-14, Statler-Hilton Hotel, Boston. Assn. headquarters, 271 Madison Ave., New York 16, N. Y.

Society of Plastics Engineers, Inc.—Regional technical conference, June 14, Montreal, Canada. Society headquarters, 65 Prospect St., Stamford, Conn.

American Society of Mechanical Engineers—Applied mechanics conference, June 14-16, Illinois Institute of Technology, Chicago. Summer annual meeting, June 11-15, Statler-Hilton Hotel, Los Angeles. Society headquarters, 29 W. 39th St., New York 18.

Drop Forging Assn.—Annual meeting, June 14-17, The Greenbrier, White Sulphur Springs, W. Va. Assn. headquarters, 1121 Illuminating Bldg., Cleveland.

Pressed Metal Institute—Sales conference, June 15 - 16, Bedford Springs Hotel, Bedford Springs, Pa. Institute headquarters, 3673 Lee Rd., Cleveland.

Material Handling Institute, Inc.—Meeting, June 18-20, Hilton Hotel, Pittsburgh. Institute headquarters, One Gateway Center, Pittsburgh.

Alloy Casting Institute — Annual meeting, June 18-20. Institute headquarters, 1001 Franklin Ave., Garden City, N. Y.

American Electroplaters' Society—48th Annual convention, June 18-23, Statler-Hilton Hotel, Boston. Society headquarters, 445 Broad St., Newark, N. J.

National Tool & Die Manufacturers Assn.—Summer meeting, June 21-25, Schroeder Hotel, Milwaukee. Assn. headquarters, 907 Public Square Bldg., Cleveland.

American Society for Testing Materials—Annual meeting, June 25-30, Chalfonte - Haddon Hall, Atlantic City, N. J. Society headquarters, 1916 Race St., Philadelphia.

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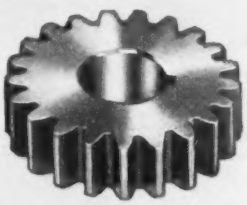
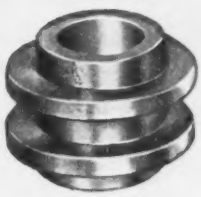


Reverse Pinion, 3"



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Management pre-tests inventory

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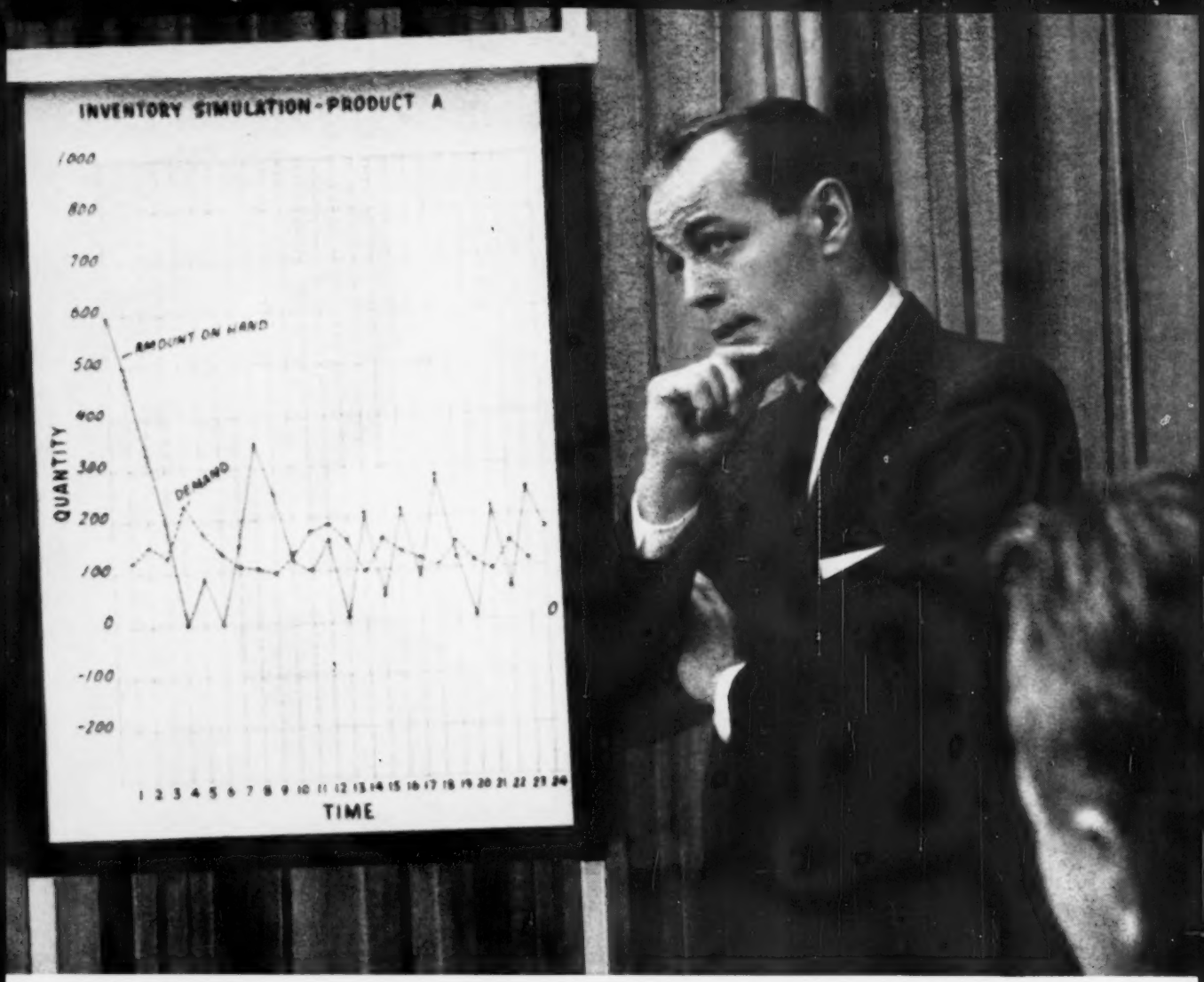
This technique lets you test and evaluate alternate plans electronically without disrupting present operations. In effect, it lets you turn *hindsight* into *foresight*.

Simulation is performed by creating within the computer a mathematical model of an inventory control system. Then the model is subjected to various demand situations. In every case, the computer reports what would have happened had this particular system been used to handle each situation. Of course, both the model and the demand factors can be endlessly varied.

Here's the important thing: Through simulation, the trial-and-error method of determining a course of action is performed within the computer—not during the course of your firm's business. This gives you a fast way to test plans under a wide range of conditions before actually putting them

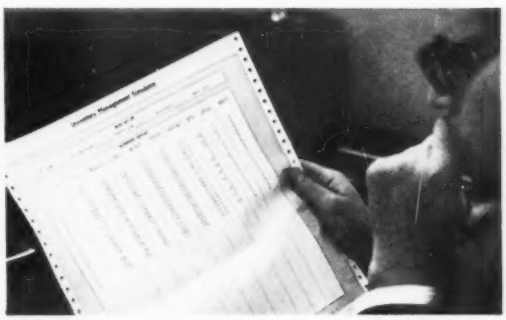


LOOKING AHEAD. Management has run a computer simulation of a proposed inventory plan. Company executives (above) now examine charted results showing how the plan might work, what problems might arise, where improvement might be sought. Print-out sheet (below) from an IBM computer contains facts needed to judge long-range results of a given inventory control plan. Inventory Management Simulation takes much of the guesswork out of planning.

decisions with electronic speed

to use. Unprofitable or inadequate courses of action show up in advance. You avoid them. And you select with confidence the system best suited to your firm's objectives.

Getting started. If you are an IBM customer, you can take advantage of the Inventory Management Simulation Program at once. IBM helps you collect the facts you need... and helps you set up a computer program to analyze them.

Ask your IBM representative to show you how this new technique can uncover *your* most effective inventory policy.

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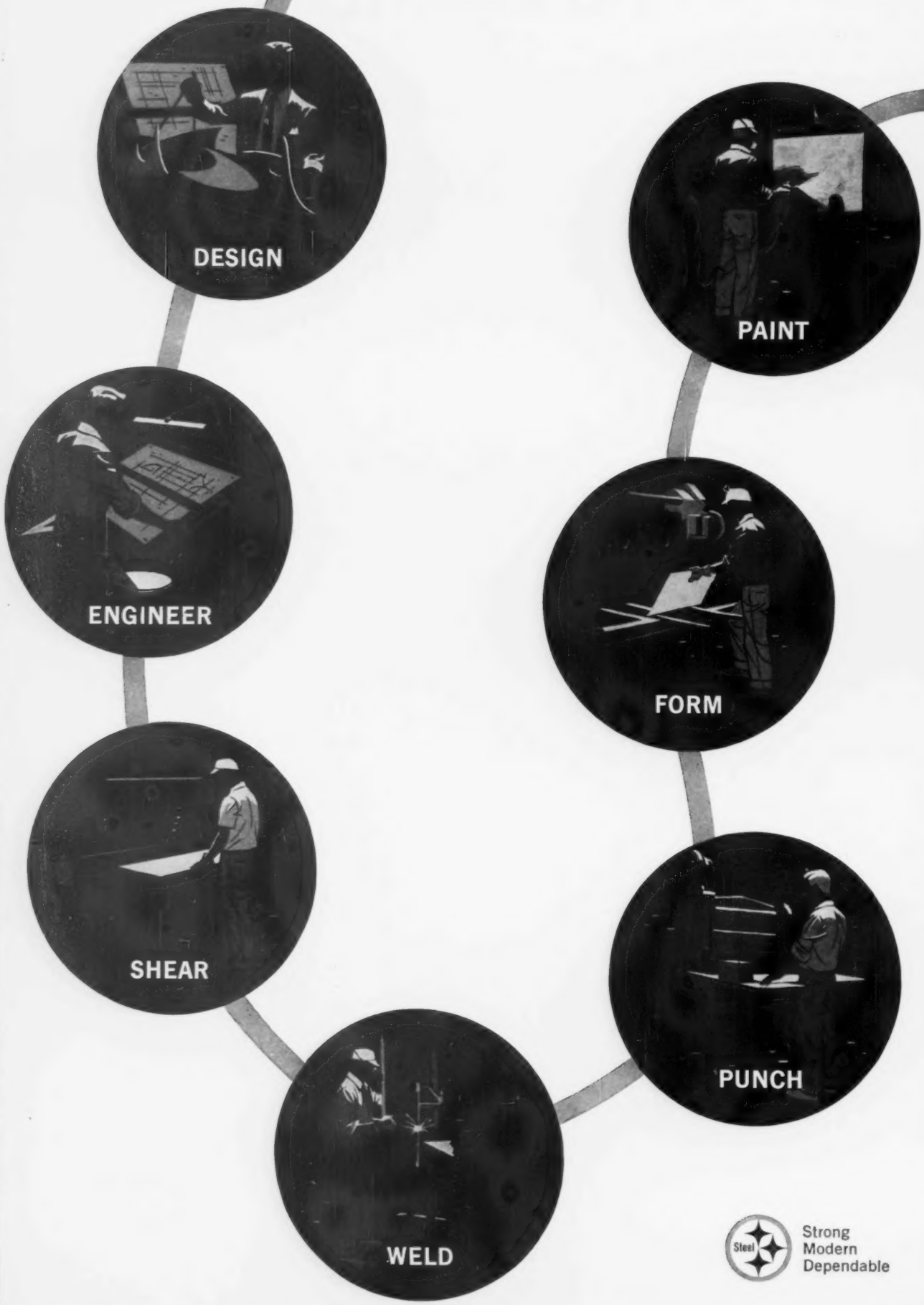
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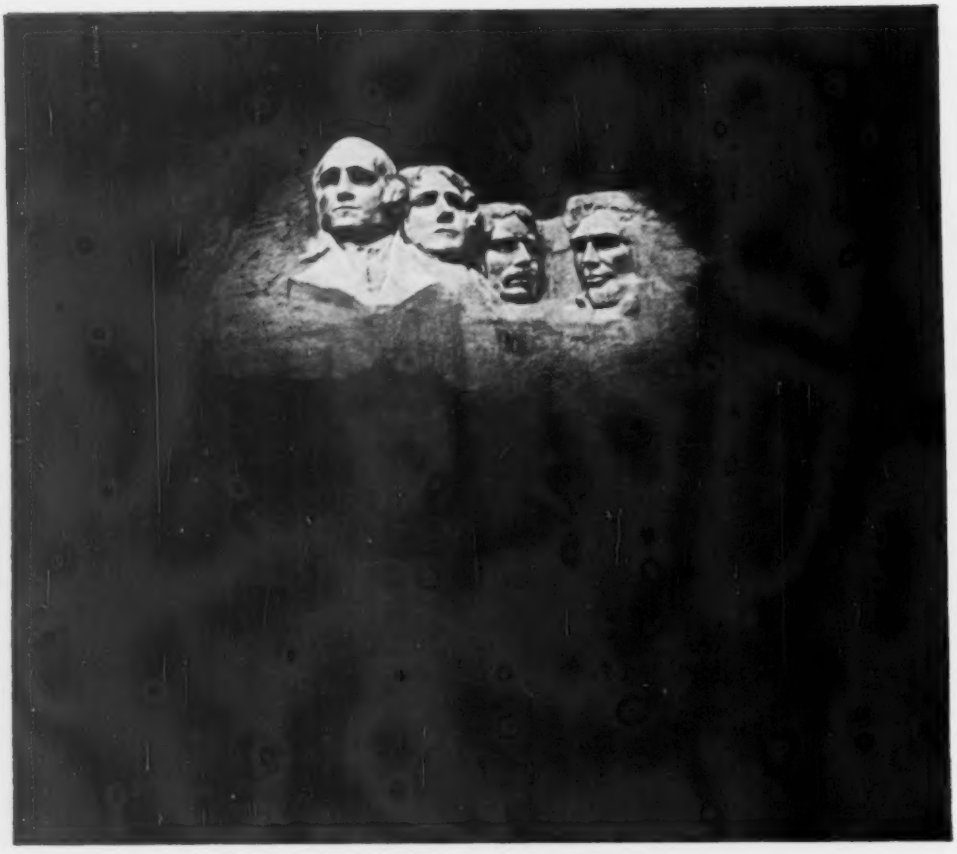

Spotlights on standards...

the four American Presidents, carved out of the mountainsides, set standards which contemporary "public servants" might well emulate. This scene is particularly awe-inspiring at dusk, spotlighted by Crouse-Hinds, manufacturers of industry's standards in special purpose lighting, explosion-proof electrical equipment enclosures, traffic control equipment, and world-famous condulets.

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Reports Mr. Floyd Quinn, Plating Foreman: "Our MEAKER was installed in 1929 to handle condulets up to ¾" diameter. We have been processing from ½" *up to 6" diameters for years*, with no modification to the equipment." That's versatility!

No wonder Mr. Quinn adds: "If we were to install another automatic plater tomorrow, we'd insist on a MEAKER with little change from the one we have."

MEAKER has been building automatic processing equipment for continuous or batch type metal finishing since 1899 . . . from "compact-a-matic" units occupying minimum floor space and for limited production requirements—to the world's largest automatic plating installation which occupies over 180,000 square feet and produces 4½ acres of plated surface every 16 hours.

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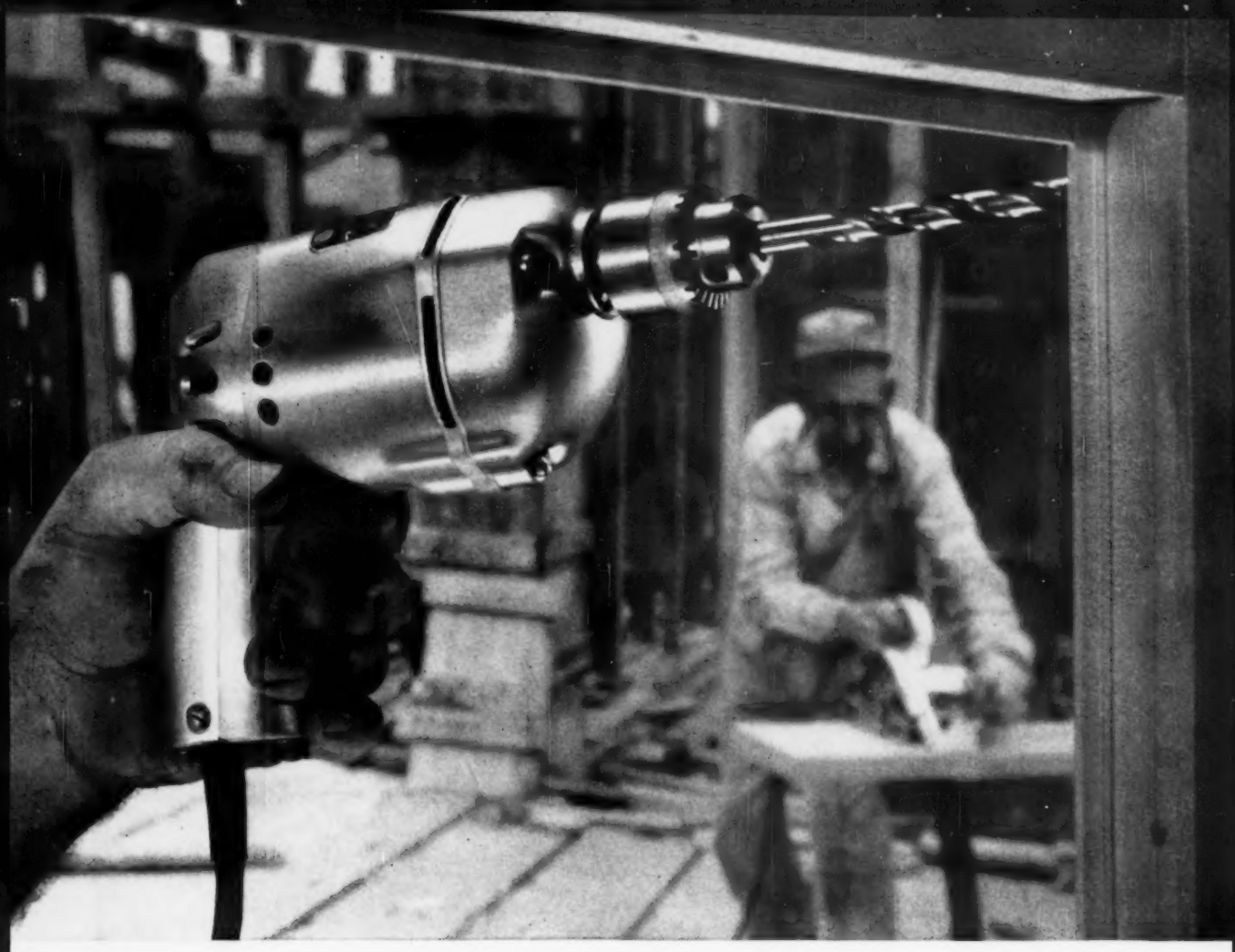

New B&D 3/8" Special Drill is light in weight with an added twist for heavier work

If you want a lightweight tool that talks torque, the new Black & Decker 3/8" Special Drill says plenty. In fact, it has over twice the torque of its famous lightweight look-alike—the B&D 1/4" Special Drill. You'll find it thrives on driving 3/8" twist drills, 3/4" wood bits, 1/4" masonry bits and hole saws up to 1 1/2" in maintenance and installation work.

The B&D 3/8" Special Drill has the power geared down to speed through every job without let-up. It's balanced from chuck to grip for still easier handling. It's made stronger inside and out to stay on the job as long as you do. Mount it on a bench stand . . . and you have a drill press for closer precision work.

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THE FARM MARKET could be going into one of its strongest years. Even flood damage has brought new Federal relief money. Much of this money is being spent for improvements on farm equipment. With good crops expected in other areas, it appears that not even falling farm prices can prevent strong buying by farmers.

SALESMEN FOR RENT idea is catching on in a big way. Salespower, Inc., only two years old, has over 250 offices in operation. The company, on a straight fee basis, provides sales programs and salesmen to manufacturers for varying periods. Some major metalworking companies are using leased sales services for new product promotion, new market buildup, and other programs.

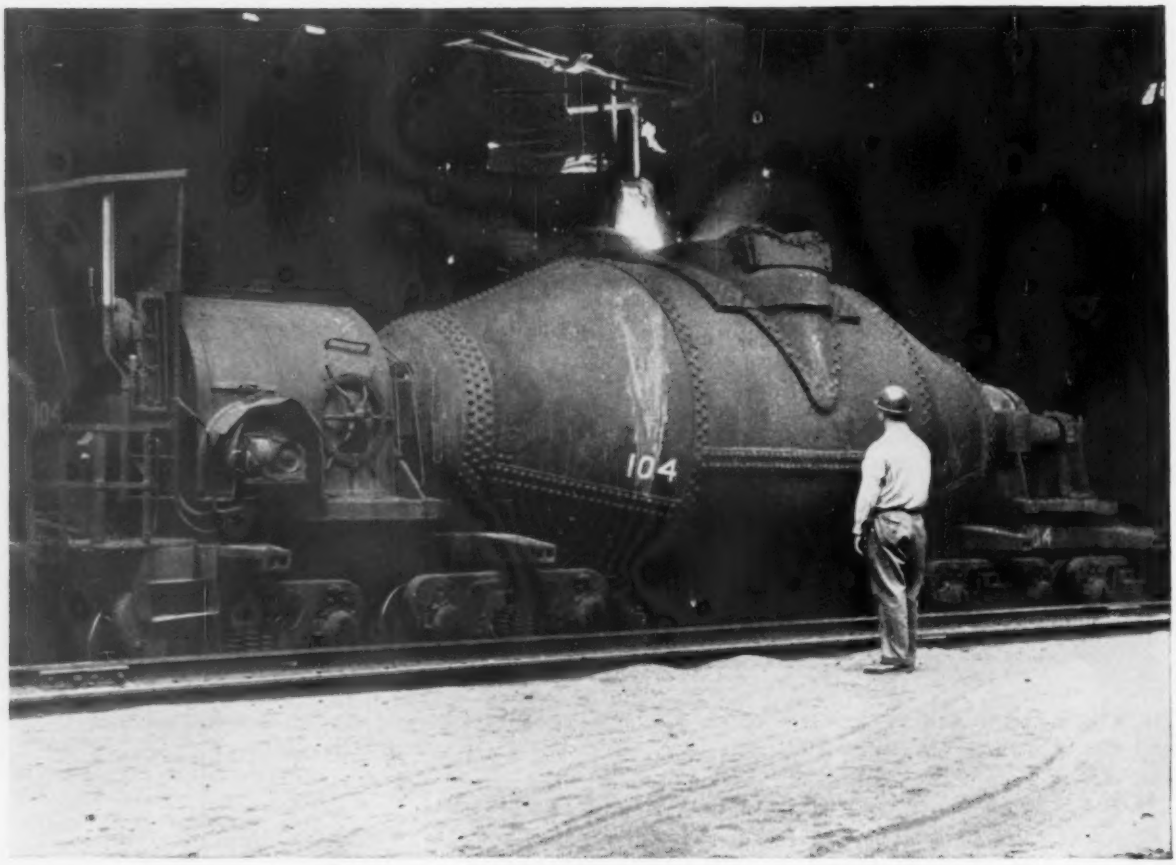
TITANIUM SHIPMENTS indicate a record year could be in the making. However, price competition is taking some of the joy out of this prospect for one producer. Prices are being figured specially for every major order, says this source. The squeeze is tightest on semi-finished products.

R&D GOES WEST. General Motors Corp. president, J. F. Gordon, says the Land Operations Dept. of GM's Defense Systems Div. soon will be moved to California. He says GM plans eventually to locate all GM defense R&D facilities on the West Coast.

MACHINE TOOL ORDERS in April fell below the 1960 monthly average. Net new orders for metal cutting type machine tools totaled $41.6 million in April, 0.9 pct below the 1960 monthly average. April shipments were off 6.7 pct to $39.5 million. Net new orders for metal forming tools totaled $6.4 million in April, a drop of 49.2 pct below last year's monthly average. Shipments dropped 13.1 pct to $13.6 million.

ELECTRIC TRUCKS are being readied for an invasion of the delivery truck market. The Cleveland Electric Vehicle Co. is offering an electric truck that it says can save nearly $3 per day per truck in operating costs. The company is aiming at the annual 42,000 unit local delivery truck market.

DIESEL ENGINES FOR AUTOS have scored a gain in the Mercedes-Benz line. In 1959, only 7 pct of M-B sales were diesels, says J. B. McWilliams, vice president of Mercedes-Benz Sales, Inc. Today, diesel engines are in almost 18 pct of M-B cars.



How mixer-type hot metal cars roll cool at J & L Aliquippa

Transporting *all* the iron produced at Jones & Laughlin's Aliquippa Works is the big job done by fourteen mixer-type hot metal cars like the one shown above. To make sure wheel bearings run cool and keep running even under heaviest loads and impacts, car builder M. H. Treadwell Co. Inc., specified Timken® tapered roller bearings for all the car journals. Because they roll the load, Timken bearings practically eliminate friction. Cars start and roll easier, save power. Because of their taper, Timken bearings take any combination of radial and thrust loads. And full-line contact between rollers and races gives Timken bearings extra load-carrying capacity. Bearings run longer, smoother. Axles run true, minimizing wheel and rail wear. Maintenance is reduced to a minimum.

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AISI: Good Times Are Ahead

Steelmakers Have Problems, But the Worst Is Over

Steel industry executives at the American Iron and Steel Institute's general meeting held their optimism in check.

But they are convinced that the recovery is real and will continue well into next year.
By Tom Campbell

■ Steel officials attending the American Iron and Steel Institute's 69th general meeting at New York last week met in the midst of a better tone in the steel business.

A year ago the economic outlook was clouded. This week there was restrained optimism—restrained officially and publicly. But in sidebar talks it was clear that most steel officials believed that there are good times ahead.

Most of the talk was tempered by the fact that profits were not up to par, labor costs were up and were going higher, and there was little real enthusiasm for what lay ahead in the way of government controls.

Wishful Thinking? — In some cases it was believed there would be higher steel prices. But at the same time, it was clear that much of this talk was wishful thinking. The consensus is that there should be a steel price increase. But it was impossible to get any real indication that there would be a steel price hike.

The strongest pitch to the industry on its parochial attitude came from Logan T. Johnston, president of Armco Steel Corp. He warned the industry that it must, in the future, accept the fact that it should work in the world and not in the domestic picture alone. Mr. Johnston can speak with authority on the foreign situation. His company has for years been an early bird in all areas of the world where steel conditions have changed from past practices.

Beyond the Waves—Mr. Johnston laid it on the line when he recommended strongly that the American steel industry be an international industry. He left no one in doubt as to the quality and increasing tonnage of steel being made abroad now.

He startled his audience of steelmakers by saying that in the mid-70's the world—outside the United States—would see an annual capacity increase of 250 million tons of steel.

He warned that American makers would not be able to share in this demand by exports alone. The only way they can become involved in this great increase in world steel demand will be to become part of the steelmaking in foreign nations, he said.

It was clear from talks with steel people in the corridors of New York's Waldorf-Astoria Hotel that the import-export question was uppermost in their minds. But at the same time, they were also worrying about the future of the domestic market.

What They See — Here are the main market distillations of at least a half-a-dozen top steel officials:

1. The increase in steel output

EXECUTIVE CONFERENCE: AISI's annual meeting brings many executives together. Meeting here are (l. to r.): M. D. Howell, executive vice president of the Institute; B. D. Thorne, architect; B. F. Fairless, Institute president; and Dr. J. B. Fisk, president, Bell Telephone Laboratories.

is the real McCoy. It will continue well into next year.

2. The summer letdown will be less than most people think. If anything, the current rates of output will be maintained for at least most of June and part of July.

3. The oil and gas industry will not be in the steel market in a big way until next year.

4. The steel inventory situation is now reaching the point where it will be necessary for many steel users to take in more steel than they have done in the past year.

5. Many steel companies are building up semi-finished steel supplies so as to be in a position to make fast deliveries.

Rate Checking — There is still much steel capacity and an ardent type of competition among steel firms—so much so that each is watching the other's operating rate and demanding some explanations if they seem out of line.

When an attempt was made to talk to steel officials about the labor outlook, most of the time a dead silence was encountered. But it was learned that the past forecast of The IRON AGE is not too far in left field: There is at least still a 60-40 chance that there will be a steel strike.

Whether or not there is to be a strike, it is a certainty that steel users will start piling on the orders and the pressure by the end of this year. It was made clear, from talking with oldtimers, that customers would be in the steel market right up to the deadline next June 30.

Under the Shield—Already, private talks in steel leaders' rooms bring up the name of Arthur J. Goldberg, President Kennedy's Secretary of Labor. The consensus is that he is probably one of the most knowing and intelligent members of the President's cabinet.

And along with this goes the feeling that if labor and management are ever to get together it will be under the aegis of Mr. Goldberg. That time may come when and if the steel labor meetings reach an impasse.

Highlights of AISI Meeting: Optimism and Caution

On Foreign Affairs: The view is that steelmakers will have to take more interest in foreign affairs. Sidebar talks indicate that American steelmakers will have to be involved with foreign steel operations if they hope to get their share of the big world increase coming along.

On Prices: Lots of talk about how bad higher steel prices are needed. But the top people in the biggest steel firms had nothing to say about steel prices. Some officials feel that a price increase is needed, that it has to come and that it is silly to absorb so much labor cost. But no one laid it on the line as to when, how much and even if there is to be a steel price hike. Backroom talk was quite lukewarm to the idea that there would be any increase in the near future.

On Production: General idea was that steel output this year would be about 95 to 97 million tons. But some people — Tom Patton of Republic Steel, for instance—feel that output will be higher than 97 million tons. This year there is a new gimmick: Steelmakers are using a "fiscal" year running from July this year to the end of June next year to indicate that output would match the past record of 117 million tons reached several years ago.

On Labor: Dr. E. Robert Livernash, the man who directed the study on steel labor relations last year, feels that unions will have more government pressure placed on them as the years go by. Dr. Livernash rocked those who want more government interference in labor affairs by asking for real collective bargaining. His idea is that, given time and lack of interference, collective bargaining will solve most of the basic labor problems in the nation. He admonished his listeners to beware of "friends" of collective bargaining. They, more than its enemies, will be the ones who will hold back progress.

On Government Help: Commerce Secretary Luther Hodge's talk on the Administration's plan to "help" business with tax credits on new capital investments was politely received. Most steelmakers, privately at least, are disappointed at the Administrations "new" tax plan.

On Government Controls: It was felt in some of the cozy meetings that the government may slap on controls as soon as it looks as if there will be a national crisis of large magnitude. The feeling persists that Mr. Kennedy and his top people feel that wage and price controls are needed if the nation is to come out of its present dilemma. One of the foremost experts holding this view is Eliot Janeway, nationally known economist.

On Raw Materials: For the first time in years there seems to be no worry over the raw materials problems of the steel industry. No one apparently is worried about the situation in Venezuela and in Africa—despite the fact that in the years ahead a large amount of iron ore will come from those areas.

—Tom Campbell

President Urges Spending Boost

Program Will Benefit Space and Defense Industries

Congress could balk on some parts of the President's new $1.4 billion program.

But funds requested to speed up space and defense programs will probably be approved.
By R. W. Crosby

■ President Kennedy's vast new spending program is being tossed around Congress like a hot potato. In the end, defense and space industries may feel the most effects from the program.

But parts of the program seem destined to become mired in legislative controversy.

New Funds Asked—The President's message, delivered before Congress last week, calls for $1.4 billion in new funds for space, defense, civil defense, foreign aid, and manpower retraining. This money is sought for the year beginning this July 1.

In addition, the President seeks a whopping $7 to $9 billion for space, to be spent over the next five years. This money would be used to get a U. S. astronaut to the moon and back before 1970.

New defense and space spending is getting Congressional support. But plans for such things as increased foreign aid and reorganization of civil defense have met with a great deal of criticism.

Prices Singled Out — Industry bristles, too, at one note in the President's message. The chief executive again warned industry against "unjustified price and wage increases." He said labor and industry must pursue responsible policies in this direction.

Mr. Kennedy did not request additional taxes to finance his requests. He said they can be done in the existing budget. However, it probably will send the budget deeper into the red.

Where It's Wanted—The President's chief recommendations for next year:

Space—Funds to begin speeding up work on a moon spacecraft; $23 million to step up development of a nuclear rocket; $50 million for communications satellite development; and $75 million for worldwide weather satellites.

Defense—Modernization of conventional armed forces, including increased non-nuclear firepower. This will involve an extra $100 million for new Army equipment such as helicopters, personnel carriers and howitzers.

Foreign Aid — Appropriation of an additional $250 million for use in specific areas in time of an emergency and an increase of $285 million for military assistance.

Domestic Economy — A manpower retaining program which may cost about $60 million. Action to cut the cost of mortgages on private homes. And $88 million to increase the lending authority of the Small Business Administration.

Civil Defense—$300 million for civil defense, triple the present appropriations. The Office of Civil and Defense Mobilization would be revamped with civil defense controlled by the Secretary of Defense. A highly accelerated program for shelter construction would be begun.

The President's spending program would increase the $84.2 billion budget he asked for in March to $84.9 billion. This would advance the 1962 budget deficit from $2.8 billion to $3.5 billion. However, the President believes the increased deficit could be taken up by the expanding economy.

URGENT CALL: President Kennedy wants Congress to beef up spending for space, defense, foreign aid, civil defense, and manpower training.

Report From West Germany

Labor Shortage: No Letup in Sight

Two of West Germany's biggest headaches are the shortage of labor and housing.

With no sign of an early letup, both are adding to the pressures of inflation.

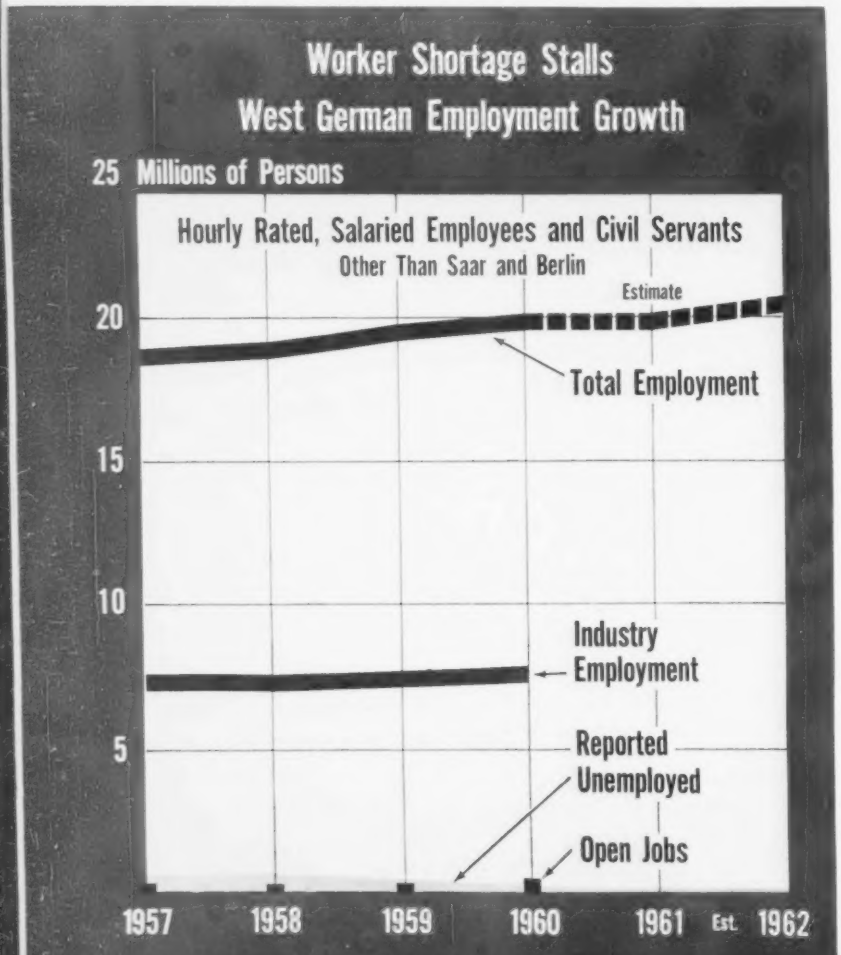
By E. C. Beaudet

■ "The German worker has never had it so good."

This is the remark one hears most often about the labor situation in the industrial centers of West Germany. For the most part it's true. Never have wages been so high or jobs so plentiful.

In fact, some see the critical labor shortage as the only foreseeable brake on the booming West German economy. From now on, they report, any further expansion of the economy must come from productivity gains rather than additions to the labor force.

The Jobless Rate—With unemployment running less than one percent of the labor force, it's hard to disagree. At the end of 1960 there were only 235,000 registered unemployed compared with a total employment of 19.8 million.



And last year, for the first time the number of job openings listed by the Federal government surpassed the number of registered unemployed. By the end of March 1961 there were 578,600 open jobs and 163,200 unemployed.

Like all statistics, these have their limitations. Practically speaking, there is no unemployment in West Germany today. Some of those registered as unemployed represent workers looking for a second job.

Imported Workers—If the upsurge of moonlighting is indicative of West Germany's labor shortage, even more so is the government's efforts to import workers from several other countries in Western Europe.

Not an unusual sight in rail, air and bus terminals of major industrial cities are groups of Italian, Greek, Spanish and Turkish workers being escorted to their new jobs or housing locations or gathered together for recreation.

In some plants a visitor will find whole production groups speaking the language of one of these groups. On plant bulletin boards, notices to employees are prepared in several foreign languages.

Customs Call—The situation is often not without its exasperating and, when seen from a distance, amusing incidents.

In one manufacturing plant near Stuttgart, for example, an entire crew of Italian workers took off for home shortly before last Christmas and returned two weeks later. The incident was not uncommon, but it's still not exactly the type of behavior German managers have been led to expect from employees. The labor shortage being what it is, they were welcomed back with open arms.

Despite these minor difficulties, West Germany industry is more than happy to take as many foreign workers as it can get.

Recruiting Workers—At the end of March some 408,600 of them accounted for two pct of the total employment in West Germany. This was 83,000 more than the previous record number of foreign workers in September, 1960. During March, 42,000 were put into jobs. And there were still 64,600 more openings for foreign workers.

Only recently, West German Labor Minister Theodro Blank visited Rome to negotiate with Italy's Labor Minister Florentino Sullo for 100,000 more Italian workers.

Want Wage Hikes—With the economy so strong and the labor market so tight, unions are putting on greater pressure for higher wages this year. The goal is an average of 10 pct over last year. Coming on top of an average increase of 9.4 pct in 1960, some say this is too much, too soon. It can only add to the inflation now building up under the economy.

Regardless of their increasing demands, strikes by West German unions have been remarkably few. Last year they hit a ten-year low. Only 28 plants, involving 17,000 workers, were strike-bound for a loss of 37,700 working days. In 1956, 1.6 million man-days were lost because of strikes. The average strike in 1960, mostly in the steel industry, lasted two days.

Some Discontent—If these conditions make the West German worker content, there are others which make him unrestful.

NEXT WEEK

West German Machine Tools

The machine tool and machinery industries in West Germany are operating at a high level. Next week's report tells of their growth, order backlogs, exports and 1961 sales outlook.

SHOPPERS: With money to spend, German workers seek more luxury goods like those displayed in expensive stores in Dusseldorf shopping center.

For one thing, many of the old standards are changing. Moonlighting, once not done even by blue collar workers, is spreading to white-collar groups. The trend is spurred on by a desire for more of the luxury goods the West Germany economy is turning out in abundance.

With more luxury goods in demand and more money in circulation, inflation can become a serious problem. As one German official put it, "There is a great need for the workers to be able to invest in real assets." By these he meant houses and the land that goes with them.

Housing Shortage — As things look now, however, it will be some time before the housing shortage is licked in West Germany. Some of the best estimates call for it not to level off before 1970.

Presently the shortage is put at 1.8 to 2.0 million dwelling units. Some 550,000 were built last year and the same amount of building is expected to take place by the end of 1961.

Meanwhile, construction prices are sky high and despite the higher wages and high level of employment, many workers are unable to afford the cost of a new home. Construction prices have gone up about 30 pct in the last four years.

Stream of Refugees—As a result many families are still living together and have little incentive to save money for new homes despite the government's offer of tax advantages for those who do so. Adding to the housing shortage is the still steady stream of 3000 people per week from East Germany. These people, too, must be fed, clothed and housed.

So while the West German worker "has never had it so good," the big national problems center around his scarcity and the scarcity of homes in which he can live.

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Ask for Reprint **No. 179**

Galvanized Sheet Market Grows

Mills Act To Boost Capacity, Refine Product

Zinc coated sheet is fast moving into a bigger and brighter world. Building and autos lead as growing users.

Continuous techniques, coatings, new finishes make galvanized more versatile.

By G. J. McManus

■ Galvanized sheet is stepping up in class.

In capacity, product quality and usage, the old farm standby is moving into a bigger and brighter world.

Producers of the zinc coated sheet are adding at least eight new continuous lines. These will boost galvanizing capacity by more than 1 million tons. They will enable producers to make 25 pct more than at the start of 1960 and 2 million tons more than has ever been sold in this country.

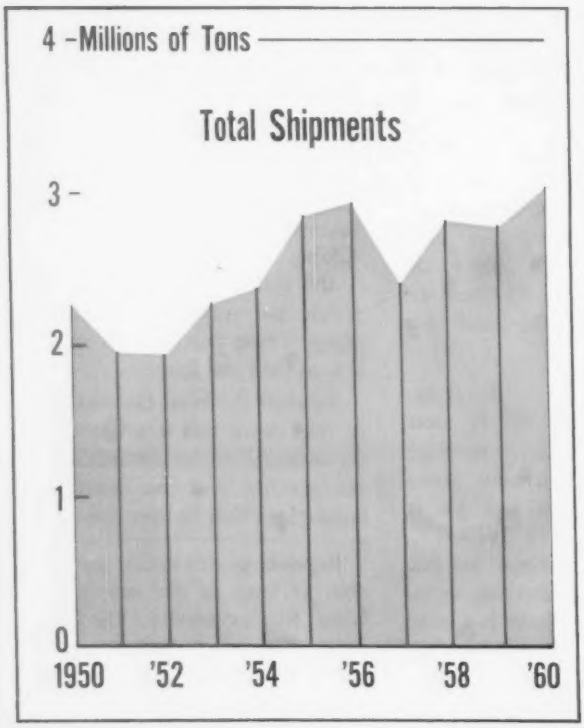
Progress Made — The mills are pushing equally hard to give more style and versatility to galvanized. Continuous techniques have been widely adopted to give a coating that will withstand forming. New finishes are being introduced. There is work on color coatings and chemical treatment. New standards of flatness, uniformity and formability are being sought.

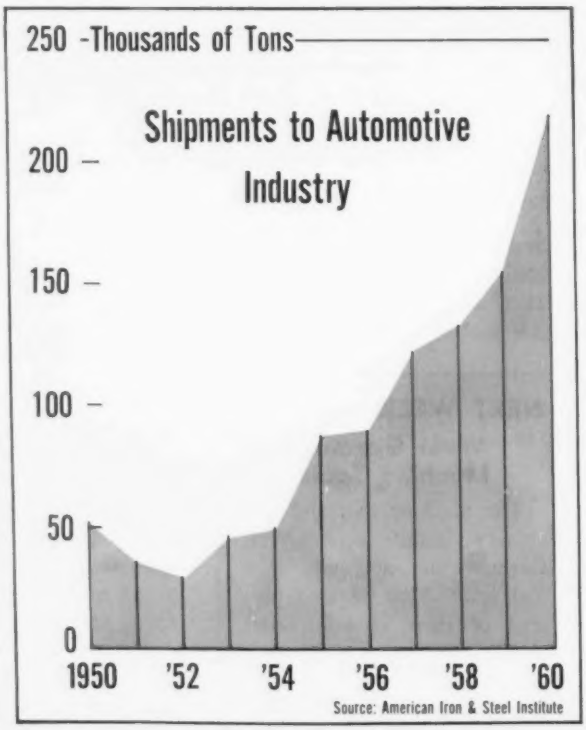
Behind all this activity is a sudden broadening of the market for galvanized. The auto industry has more than doubled its use of zinc coated sheets in the past five years. Ford Motor Co. expects to increase its take from 58,000 tons in 1960 to 80,000 tons this year (The IRON AGE, May 11). Other builders are showing more interest, and one or two breakthroughs could send the whole program through the roof.

More important, possibly, but not as easy to identify, is the big construction market. Here, ductwork and other functional applications are taking growing quantities of galvanized. Zinc coated sheets are right in the middle of the revolution that is putting metal into panels, decking and numerous other building products.

Growth Ahead—"We think continuous galvanizing has given us a product that can be used in so many tonnage applications that this is just the start of a tremendous growth period," says C. N. Reeves, assis-

Automotive Demand for Galvanized Sheet Soars





tant general manager of sales, Wheeling Steel Corp.

Growth predictions and expansion timetables are looking very good so far. Since the start of the year, continuous galvanizing lines have been put into service by Armco Steel Corp. at Middletown; by Youngstown Sheet & Tube Co. at Indiana Harbor; and by National Steel Corp. at Midwest Steel Div.

It is much too soon to know the impact of these additions but there is no sign supply has moved very far ahead of demand. Most galvanizing lines in the country are running at capacity. On production orders, mills are quoting deliveries of four weeks or more.

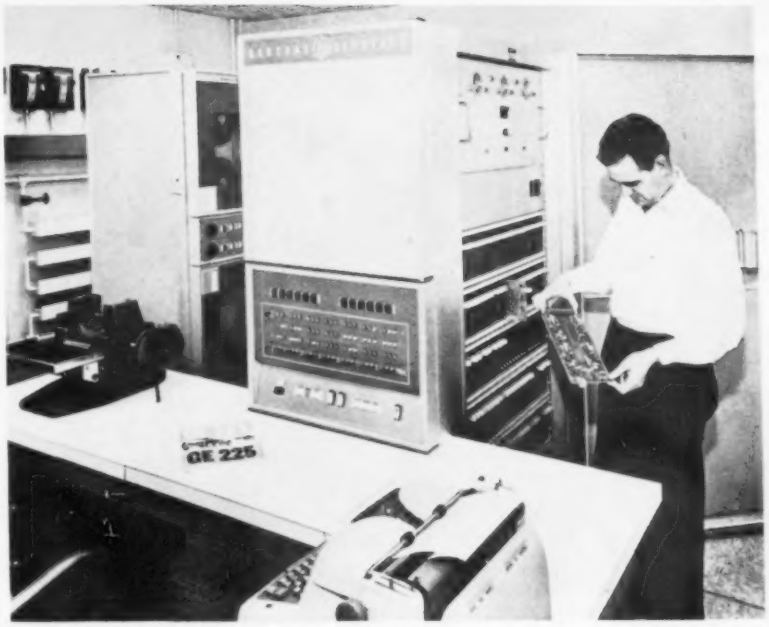
More Capacity—More capacity is planned and is being built. Estimated industry capacity in January 1960 was 4.2 million tons. At least six producers will complete plant additions in 1961-62 that will boost capacity by another 1.3 million tons. By the end of 1962 capacity will be 5.5 million tons.

Here are companies adding galvanized sheet facilities in 1961: Armco Steel, Granite City Steel, Inland Steel, National Steel, Republic Steel, and Youngstown Sheet and Tube. U. S. Steel Corp. is due to complete new additions in 1962.

The newer markets for galvanized have put a new emphasis on appearance and brought a new need for properties that go with mass production. Makers of autos and of building products want to use the sheets in places where they will be seen and look good.

Smooth Coats—This has meant providing a surface that will take a smooth coat of paint. To meet this need, most galvanizing mills will come out with what they call a minimum spangle sheet. Steam blowing, or some other means, is used to subdue or eliminate the spangles.

Need for good painting surface is critical in both key markets. Unit body designs of some auto models make it necessary to either expose a galvanized surface or have the coating only on one side.



ELECTRONIC LIBRARIAN: An engineer scans one of 750 printed circuit, logic component cards in the GE 225 cabinet. Tape units are above.

Computer Speeds Up Metalworking Data

American Society for Metals now has an electronic computer in its documentation service.

It will act as an electronic librarian.

■ The technical information service of the American Society for Metals, and the Western Reserve University Documentation Center in Cleveland, got a boost last week with the world's first electronic computer of its type.

The new General Electric 225 general purpose computer, costing about $100,000, will go through 100,000 technical papers hourly.

Code System—It is based on a codifying system worked out by Director J. W. Perry and associate Director Allen Kent. Work was sponsored by the ASM, in cooperation with Miss Marjorie Hyslop, manager of Western's documentation service.

"With a mechanized searching system, valuable information on any desired aspect of metals can be on the desks of American industry within two to three weeks after publication, says Miss Hyslop.

High Output—The ASM Information Searching Service so far has delivered over 27,000 abstracts to 157 subscribers.

Dr. C. Walter Stone, director of the Educational Media Branch of the U. S. Office of Education, Washington, says that without such instruments, an epitaph for our civilization might well be, "They couldn't recall or understand all that they had once learned so well."

SALES PROSPECTS: Exhibitors at Design Engineering Show held in Detroit found many visitors ready to buy.

Shows Prove Business Is Better

Exhibitors at Detroit's Design Engineering Show and New York's Tool Engineers' Show were pleased with results.

More visitors took an active interest in the products shown, more were ready to order.

■ Proof that business is improving was clear at last week's Design Engineering Show in Detroit and the Tool Engineers' Show in New York.

Exhibitor after exhibitor at both shows told IRON AGE editors the same story: Sales are stronger and the outlook for the rest of '61 encouraging.

Turning Loose—At the American Society of Tool and Manufacturing Engineers Show in New York, F. John Pichard, assistant director of marketing for Wheelabrator Corp., summed it up this way: "These people have dough to spend. They've been sitting on projects through 1960 and now they're starting to turn loose."

At Detroit, an exhibitor of mechanical components pointed out: "Last year people were saying they would like to have a certain machine, but couldn't afford it. You don't hear that now. In fact we had two customers drop by who have been talking about ordering for a year. They finally told us to make delivery."

Optimism With Hope—Most of the exhibitors at the Tool Show reported orders were better than at the last show. The majority expected business to be better this year than in 1960. But propping up the optimism was a liberal amount of hope.

James B. Anderson, cutting tool sales manager for Kennametal, Inc., noted orders have arrived in better volume the last few months. He felt there was some anticipation of better business by his customers, some inventory rebuilding, and some sales pickup. But he said the upturn was still "very spotty."

Salesmen at the Brown and Sharpe Mfg. Co. booth were also optimistic. One cutting tool spokesman admitted business was off 20 to 25 pct last year. But now, he continued, orders are coming in at an increasing rate. He expects sales to easily top last year, but is concerned the summer months may take the edge off the improvement. Another Brown and Sharpe salesman said industrial tool sales for the company in the first four months of '61 were over those of the same period in '60.

Bigger and Better—At Detroit, about 400 companies displayed about $10 million worth of products including the latest developed by research and design laboratories. The exhibitors were generally pleased with the interest the displays received.

"The show is bigger and better than we expected," said a salesman at the Minnesota Mining and Mfg. Co. booth. "We're attracting the type of visitors we want, mostly engineers and sales managers."

For Northern Cranes

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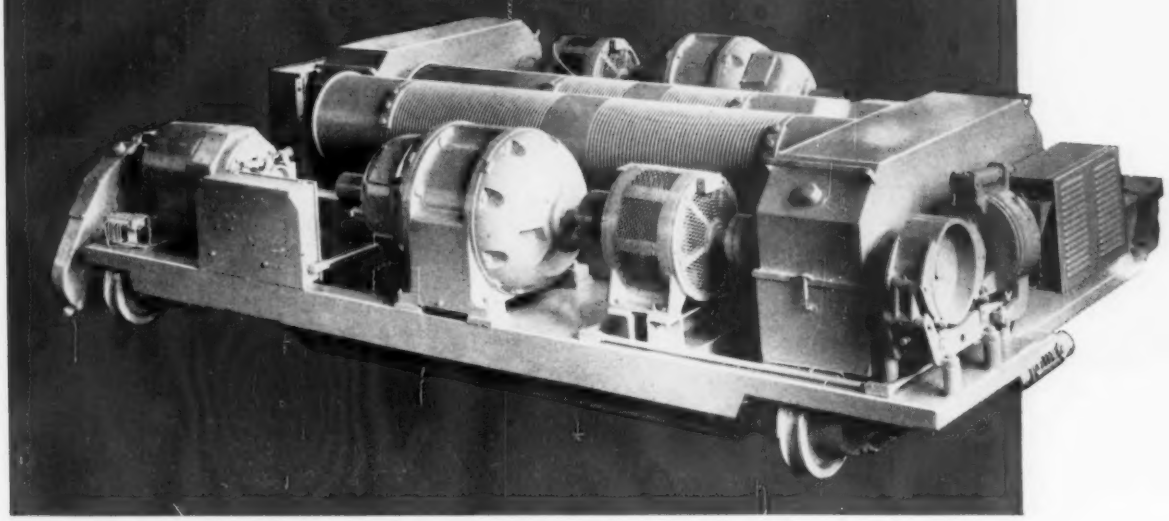

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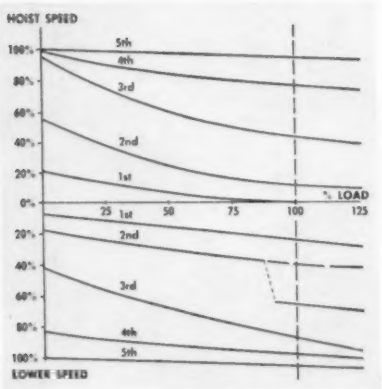

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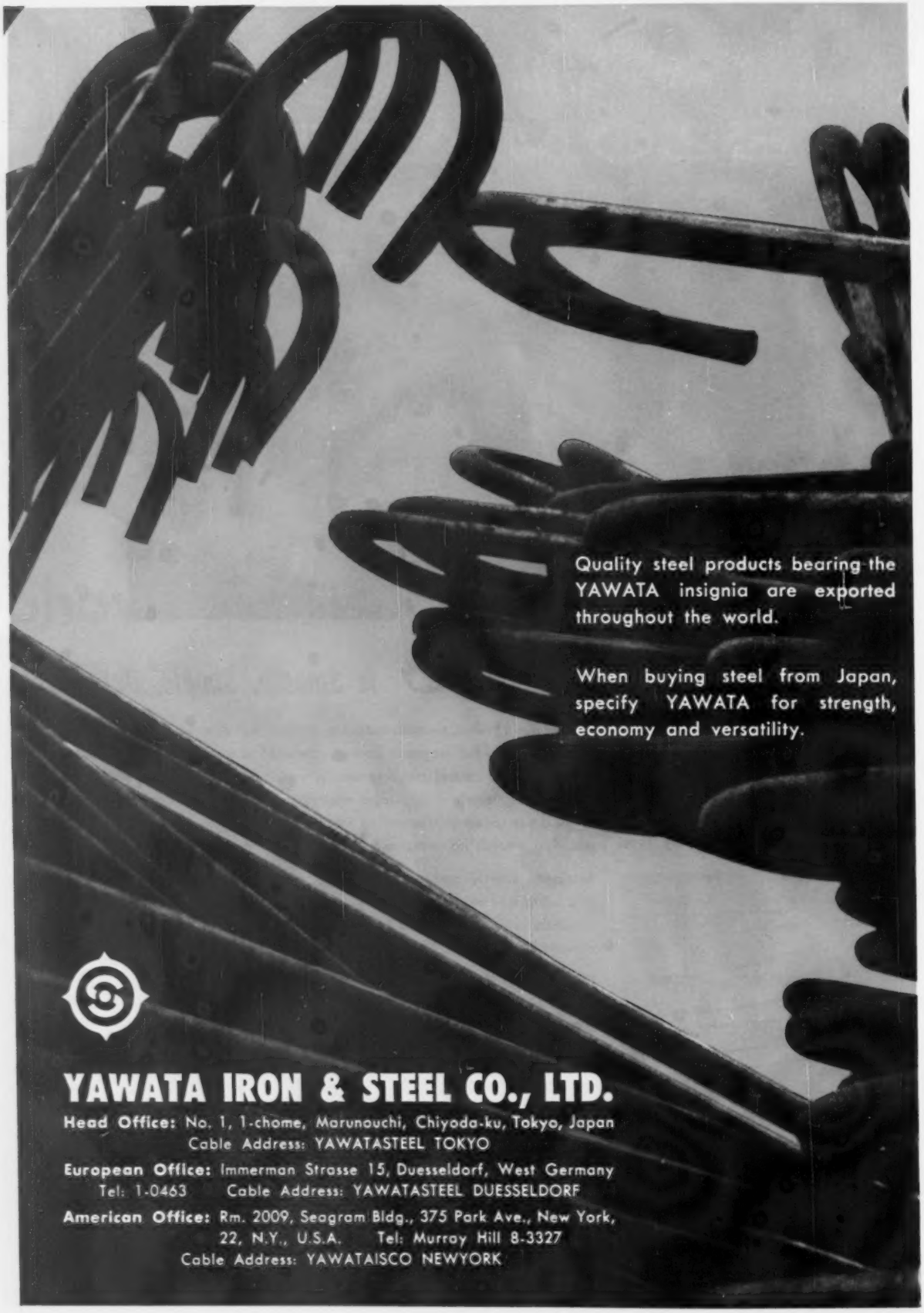
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What Managers Must Avoid

Any personality defects an executive has will interfere with his direction of those under him.

Here are some of the traits which effective managers will do well to avoid.

■ How does the man on top look to those under him? What defects does he have which may make them resent or discount his directions?

An analysis of the traits which can hamper a manager has been made by Dr. Ray E. Brown, professor of business administration at the University of Chicago.

Prime Defect—Smugness is the most dangerous personality trait for an executive, he says. "Since the boss deals in problems employees bring to him, he sees people in their moments of weakness. Since the boss makes the rules, it's easier for him to dispose of a problem that looks tough to his subordinates."

"The chance to make up the answers, as well as the questions, is more than a passing advantage to the administrator," Dr. Brown observes.

And What It Causes—What happens when the boss gets too smug? He may develop a false confidence in his ability to solve all the problems the organization might face, according to Dr. Brown. Other probable results: Smugness keeps the boss from being his own best critic. It neutralizes the small dash of anxiety he needs to season administrative decisions. And it insulates him from the current of ideas around him.

"Entrenched behind his Maginot line of self-satisfaction," says Dr. Brown, "the boss becomes invulnerable to the suggestions of those who are in live contact with the problems confronting the organization."

Others to Avoid — Other personality defects can trip the man trying to be a good boss. The Univ. of Chicago educator lists some of them:

Arrogance: "Men will often-times accept abuse and unfairness quicker than disregard. In an organization, the level of regard is perhaps the major criteria by which status is determined."

Callousness: "A thick skin can make one as insensitive as a big head, and the administrator is peculiarly susceptible to both."

Skepticism: "When properly controlled, it is a healthy trait and can prevent the administrator from going off half-cocked. However, if it is not properly controlled and carefully utilized, it can become insulting to those around the administrator."

Fear: "The executives who keep score by their losses, rather than by their wins, are likely to be allergic to new ideas. They become afraid of the dark and venture out only in the company of a committee."

Stubbornness: "A passion to dominate oftens affects the judgment and action of the administrator. It can best be described as a hunger for the spotlight."

Why All Don't Answer the Call

■ Businessmen thinking about government service face a difficult choice.

Should an executive entering government give up all his company advantages, sever all his business connections? This issue—heart of the conflict of interest cases — is examined in a new survey by Elmo Roper and Associates.

To find out how business men felt about this issue, Roper questioned presidents and vice-presidents of major corporations who might be tapped for government service.

Why They Hesitate — Here are some of the opinions.

Among executives the major deterrents to government recruitment are: Loss of old job, (mentioned by 61 pct); conflict-of-interest regulations, (47 pct); cuts in pay, (45 pct); and being exposed to public scrutiny and criticism (37 pct). Executives, unlike other groups, were considerably disturbed by government "bureaucracy and red tape."

They were also critical of the need to rid themselves of company stock before entering government service. Seventy-four pct called it a serious deterrent to recruitment. Fifty-five pct said it was no solution "because it overlooks other factors making for partiality such as long associations with a company and having friends there."

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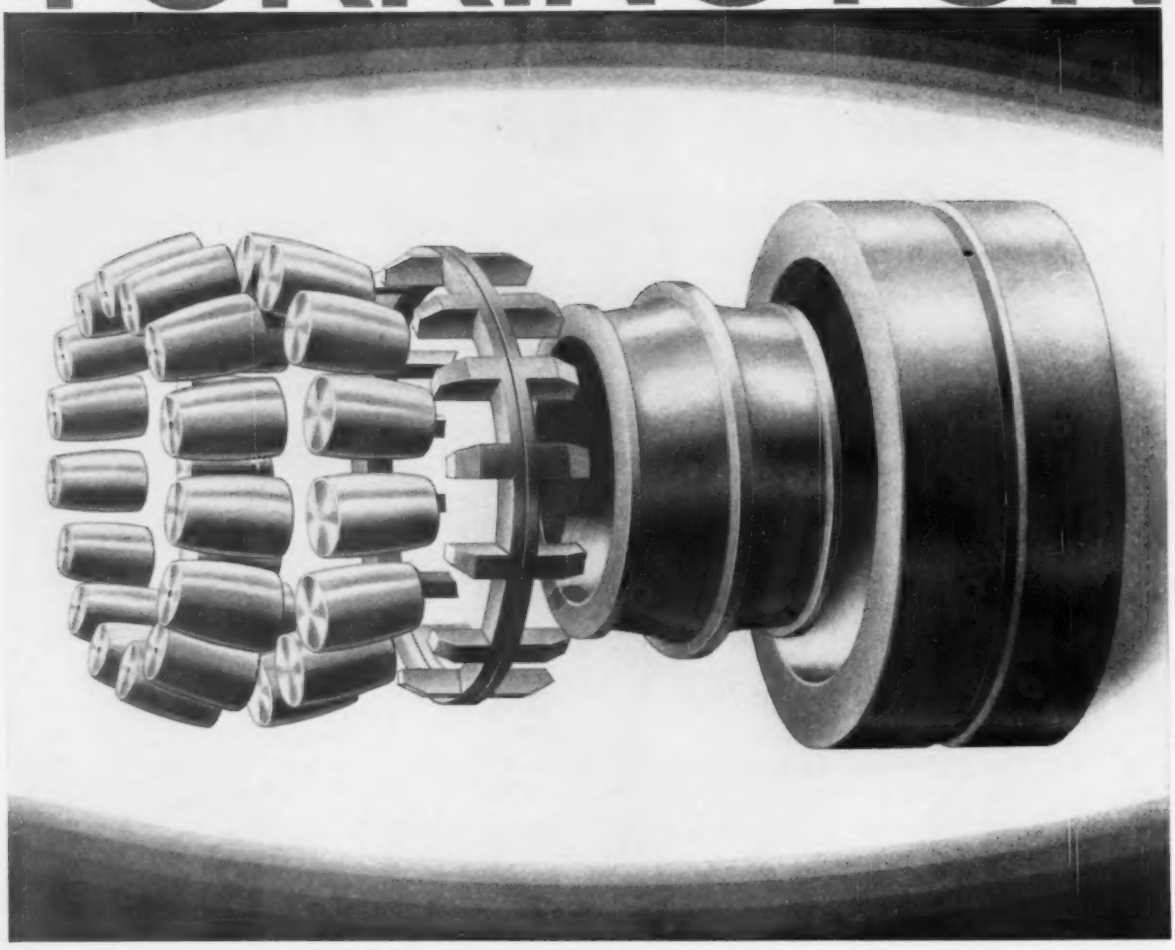

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ANALYSIS: Division managers at Hallicrafters analyze new project to determine if they can handle it.*

How Quick Reaction Capability Speeds Product Development

Industry has found that it can do the near-impossible—and get it done fast.

But it depends on selling employees on the importance of the job—and organizing them in fast-moving groups.

By K. W. Bennett

■ How long does it take to turn an idea into a finished product? That all depends.

As short a time ago as 1958 it was generally believed that seven years were needed to bring a new product idea to the finished goods stage. By 1960 this had been cut to five years.

But it can be done in one week.

A top practitioner of this high-speed product development is Hallicrafters, Inc. The Chicago electronics manufacturer is doing 50 pct of its work in the defense market. And at least one-sixth of the company's total dollar sales come from high-speed research under government contract.

QRC for Short — Hallicrafters calls it "Quick Reaction Capability." And this is how it's put into action:

In a phone call from the Wright Air Development Command at Dayton, O., an Air Force officer says that a special piece of electronic equipment is needed. It has never been built before — and no one knows if it can be built.

Richard Tobin is the contact man at Hallicrafters. Often, with the phone still in his hand, he begins alerting other members of the QRC team who will decide whether the job can be done.

Call to Action—Engineering director W. F. Frankhart is the second man to go into action. He begins assembling division managers who can provide needed data. They, in turn, call in individual project engineers in their commands.

In only one-to-three hours, the Air Force knows: 1. If it can be done; 2. How long it's going to take. 3. What it's going to cost. At that moment an around-the-clock

*(From left to right): B. S. Parmet, chief scientist; A. R. Erbe, Engineering Services; J. T. Williams, Passive Electronic Countermeasures; W. A. Frankart, Engineering; J. S. Wexler, Military Communications Div.; A. C. Todd, Active Electronic Countermeasures; and Alexander Kundrotas.

crash program can be started.

These aren't necessarily big projects. The average assignment will run about $100,000, reports Hallicrafters' president Robert Halligan.

"A Secret Weapon"—The system sounds incredible. It's good enough that a top level General commented, "Don't talk about this too much. It's better than a secret weapon." But it is being talked about. More important, some industrial companies are beginning to translate the method into their own non-defense work.

Here's how it's done:

Hallicrafters has divided it's Quick Reaction Capability group into six major divisions. Each is headed by a manager. He has under him project engineers, each heading research on one or more projects and backed by his own engineering squad.

The division engineering manager works with a division business manager. The main idea: Keep engineers clear to think about the problem at hand; keep administrative detail at a minimum.

200 Calls a Day — Centered around the engineering group, the QRC personnel literally function as a company within a company. A special purchasing branch gets needed parts. Vendors to QRC have have been briefed that delivery speed is an absolute requirement.

Purchasers seek to buy military specification items where possible, unless this would delay delivery. Engineers seek to build designs around available military specification equipment. The P.A. assigned to the project works by phone, follows his phone call with a purchase order issued the same day. This group averages 150 orders a day, often has exceeded 200.

The Model Shop—If a part can't be purchased, it's made up in the model shop. Here, 44 model makers and 6 helpers operate what amounts to a small factory. Equipment ranges up to a 50 ton press, includes 22 lathes, 14 milling machines, and electronic assembly lines. This same shop often serves as the assembly line for short-run prototype military hardware.

HASTE ISN'T WASTE: Says president Robert Halligan, "Haste is the thing we must have. This is electronic warfare—and our people know it."

Hallicrafters, with 2500 workers, has 700 engineering personnel. Of these, at least 85 pct are on call for QRC work. Of the QRC group, 35 pct are senior men, backed by 35 pct of the total who are classed as junior engineers.

Employee Morale—The system would be an organization man's nightmare. The indians look pretty much like the chiefs. Commented one Engineering Div. manager, "This is the table of organization, but don't put it on paper. In the first place, I think a lot of us aren't sure we have one."

While working in a high security plant with locked doors, company employees nontheless see what they're doing. And they often see the end product. Their conviction that they do a critical defense job makes their company a front-ranker in design capability.

Comments president Halligan: "It's hard to define, but it can't be emphasized enough. QRC is something that grows. It's basically a matter of employee morale. Our people know how critical the end-item is. They feel we're engaged in electronic warfare right now and they work hard—all 2500 of them."

Does It Work?—Does the system (and many of Hallicrafters' most eager advocates wonder if there really is one) do the job?

One electronics company labored 18 months on a project and threw up its hands. Hallicrafters mulled the idea for a couple of hours, took the job, delivered the finished item in 5.5 months. Four classified items were built in four weeks, are still in use three years later.

Built around a fast-moving engineering group, QRC calls for full supporting groups. These include purchasing, manufacturing, technical writers and cost estimating (a function which includes engineering, sales, and purchasing).

Rules to Follow—As defined by A. P. Kuzniar, a division business manager, the rules are: 1. Minimum administration; 2. decide immediately if the project will call for "extending the state of the art," and if

possible stick to jobs that can be done with existing components; 3. get the speeded-up purchasing department into the picture at once; and 4. complete company support —at all levels.

Rank is de-emphasized. Thompson Ramo Wooldridge, Inc., has used this technique with great success: Backstop the QRC group with a separate R&D group. This latter research costs less, but takes longer.

Purchasing Is Key—Purchasing is a critical function. Try to have as many as three vendors for each product category. Watch vendor performance. Will he work weekends, if he has to? Does quality suffer on a rush job?

In many cases, Hallicrafters' buyers send telegrams, saying, "We'll call at 2 p.m. today." If a buyer is making 200 calls per day, he hasn't time to wait for some one who's out for coffee, and no one can reach the buyer by phone, either. The requisitioning project engineer actually signs for delivery of most items.

Hands Off—Once the project is assigned to a division, and the division manager turns it over to a project engineer, the policy is strictly "hands off." The project engineer and his team are the show.

Work for Industry? — Can the QRC idea be translated into industry? Clearing Div., U. S. Industries, Inc., is doing it.

Reports Clearing vice president Henry Crossen: "We break incoming requests for bids into three categories — tools, automation equipment, or capital equipment. Using this QRC kind of approach, we've been able to deliver capital goods—the big stuff—on a 90 day delivery."

A specially designed single-action press for the auto industry was through manufacturing in 7 to 8 weeks. When a major appliance company wanted a special press (400 tons, 48 in. x 84 in. single action) the company asked for eight week-delivery, got it in six.

Modified QRC—Clearing uses a modified QRC approach. When a customer calls up to say what he wants, the chief manufacturing engineer, the general manufacturing manager, the sales estimating manager, and the chief design engineer decide if it can be built, what it will cost, what delivery can be promised.

A LITTLE FACTORY: Hallicrafters' large-scale model shop is actually a factory-within-a-factory and is geared to high-speed production.

The bid request is analyzed to see whether past designs (Clearing has 15,000 designs on file) can be modified. If there is a base reference in this file, the group uses a "plus or minus" system—deciding what must be added, what can be deleted from the previous design—and what it will cost. They can come up with a firm cost estimate in eight hours or less.

Close Customer Contact—If no past design experience applies, the analysis group checks: 1. Are we capable of manufacturing it? 2. Do we have the technical and design skills to create it?

The sales engineer remains in close contact with the customer. As the project moves into design, and manufacture begins, the engineering department confers weekly with purchasing department, the comptroller, and manufacturing and tooling men to readjust lead times if the process is speeded up or a bottleneck develops.

Monthly Briefings—As soon as tooling begins for the job, a weekly job schedule brings sales and management into close contact with progress on the order.

Since employee indoctrination is the heart of any successful QRC, supervisors from line foreman on up are briefed at monthly meetings on job progress.

Full Support — As with Hallicrafters, Clearing backs the engineers with full supporting groups —in purchasing, manufacturing, and customer liaison.

Many companies are using the QRC approach in defense work. Now it's creeping into their civilian work. It's surprising to find that incentives are the exception, rather than the rule. Manpower output, the real secret of QRC success, depends on a well instructed plant workforce that believes in the job it's doing.

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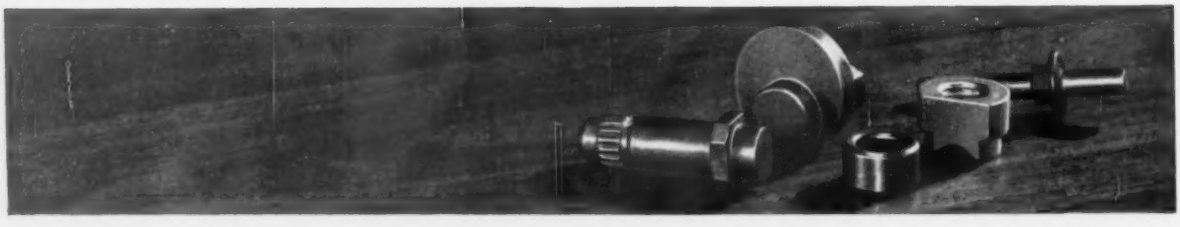
Ask for Reprint **No. 178**

Gains special part at half cost



RB&W survey seeks out ways to economize with cold formed special parts as well as with standard fasteners

Standard fasteners and many cold formed parts are closely related. They're offspring of the same machine. When called in to survey fastener usage, therefore, the RB&W Man can also ferret out those special parts which could be produced faster and for less money on RB&W's cold headers or nut formers.

The hand-held part above, for example, is a car trunk hinge spacer. Its cost was cut 50% when RB&W cold-formers took on the job of pounding them out at high speed, smoothly finished, and ready for installation.

By buying such parts, instead of making them, you save in one or more ways. (1) There's less machining time—or none at all. (2) Assemblies of several small pieces can be made as a unit—reducing assembly costs. (3) When shape of piece is such that you would have to machine excessively from relatively large diameter rod, you avoid heavy scrap loss. Sometimes cold forming becomes the *only* way to economically produce a piece—as for example, the eccentric cam shown above.

To get the most from your dollar in standard fasteners or specials, find out what the RB&W Fastener Specialist can do in cooperation with your engineers. Or write about your requirements in special parts directly to Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N.Y.

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Aluminum Axle Housing Next?

Alcoa Aims for 1963 Models in Die Cast Research

Alcoa is researching a die cast aluminum rear axle for the automotive industry.

Cost is the big problem. But the company hopes to have prototypes ready this year and a carmaker sold by 1963.
By A. E. Fleming

■ At least one aluminum company, Aluminum Company of America, is researching a die cast aluminum rear axle housing for automobiles.

No American car has an aluminum housing of this type. A major problem is cost. Alcoa is nowhere near a cost figure that can compete with cast iron.

Big Question—Prototype aluminum castings have been manufactured.

But the question remains: How long will it be before there is production on a mass basis? The estimate by Alcoa is six months to a year.

An announcement may be made late this year that cast aluminum prototypes are available for evaluation by interested car companies.

Hopes are to sign up at least one automaker for orders six months later, and to get the housing on a 1963 model.

Bumper Controversy—Steel-versus-aluminum bumpers shows every sign of continuing for a long while.

Aluminum Company of America, through its manager of transportation sales, G. E. Herrmann, takes this firm stand: "Aluminum bumpers will be on at least one U. S. car by 1963. The price will be competitive with steel bumpers."

Mr. Herrmann, in Detroit for the Design Engineering Show, was asked if this meant a 1963 model car. His answer: "In the 1963 calendar year there will be at least one mass-produced U. S. car with aluminum bumpers as standard equipment."

Recently Kaiser Aluminum and Chemical Co. officials said they believed the next big automotive breakthrough for aluminum would be in wheels.

Ford's New Compact Kept Under Wraps

Information on Ford Motor Co.'s new small car is still under wraps. And word that does leak out is so varied it sometimes seems a dozen different models are in the works.

Estimates on wheelbase range from 90 in. to over 100 in. It's agreed the car has front-wheel drive, a four-cylinder engine and will seat four passengers.

Ford Styling Pioneer Steps Down

CLOSING BOOKS: George W. Walker will lay down his drawing pencil and sketch pad this month. The Ford Motor Co. vice president and director of styling reached the normal retirement age of 65 on May 22. A veteran of nearly 40 years in industrial design, he has headed the Ford operation since 1955. He was a consultant to the company for nine years before that. His design concepts included the '49 and '59 Fords, the Falcon, Thunderbirds and the Lincoln Continental. All of his concepts broke sharply with previous auto designs.

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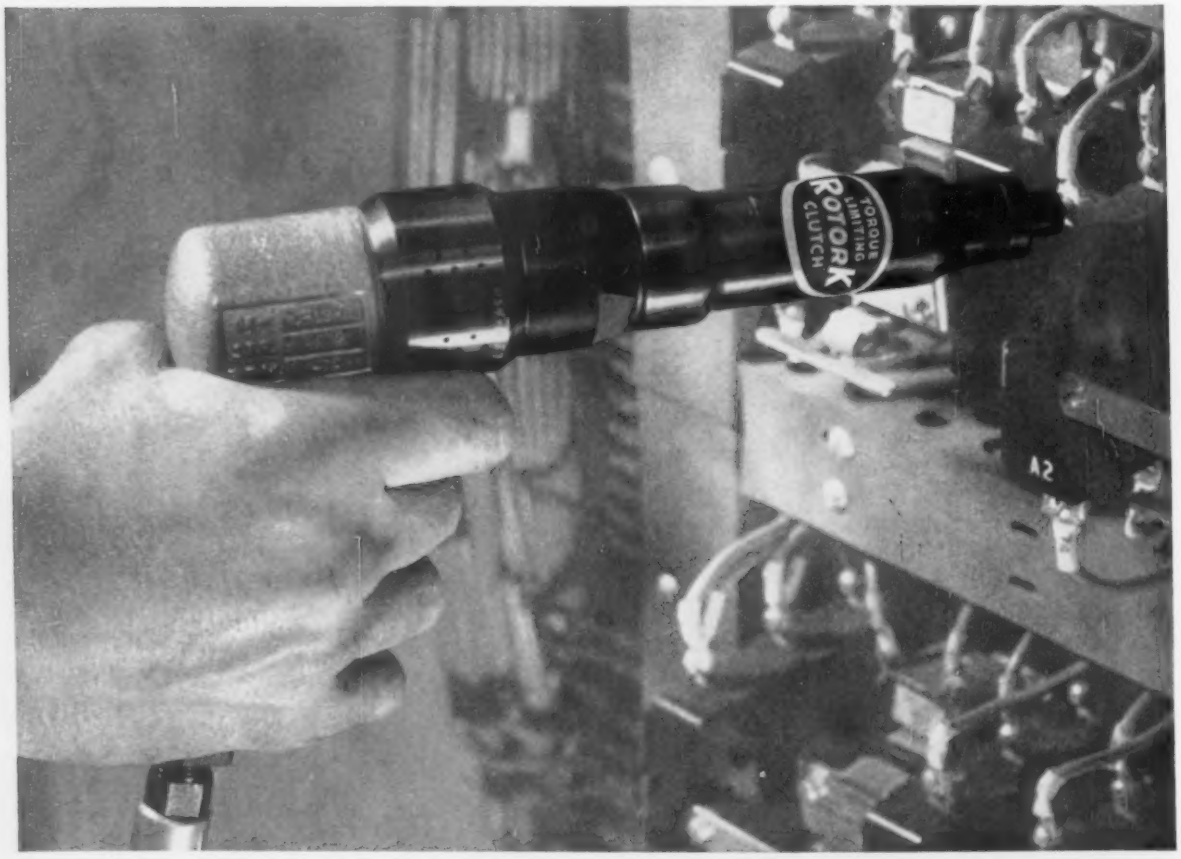
Call the nearby Rotor Application Engineer for an unbiased study of your work, or write for bulletins on Rotor Assembly Tools and RotorK clutches. The Rotor Tool Company, 26300 Lakeland Blvd., Cleveland 32, Ohio.



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Metalworking Market Widens

New and Expanding Plants Make Good Customers

New businesses are being born and older ones are expanding in Southern California.

They are all good prospects for metalworking equipment, materials and services. The range of products is widening. By R. R. Kay

■ Metalworking business is branching out in Southern California.

Here's the latest report on new and expanding plants—and what they make. The area's range of metalworking products widens every month.

These manufacturers are all good prospects for metalworking equipment, materials, and services:

Ship Repairs—Bethlehem Steel Co., Terminal Island—$10 million expansion of ship repair facilities. Aircor Jack Co., Pasadena—hydraulic cylinders. Metallurgical Consultants, Montebello—heat treating.

Reynolds Metals Co., Torrance—foil containers. Universal Molding Co., Lynwood—roll-formed aluminum angles, channels and tubing. Arnold Engineering Co., Fullerton—magnetic materials for electronic industries.

New Plant—Soule Steel Co., Long Beach—steel fabrication plant. Glo-Quartz Electric Heater Co., Inc., Pasadena.

Aluminum Expansion To Cost $75 Million

Another fully integrated aluminum company is in the making. Harvey Aluminum, Inc., Torrance, Calif., will spend $75 million on this project.

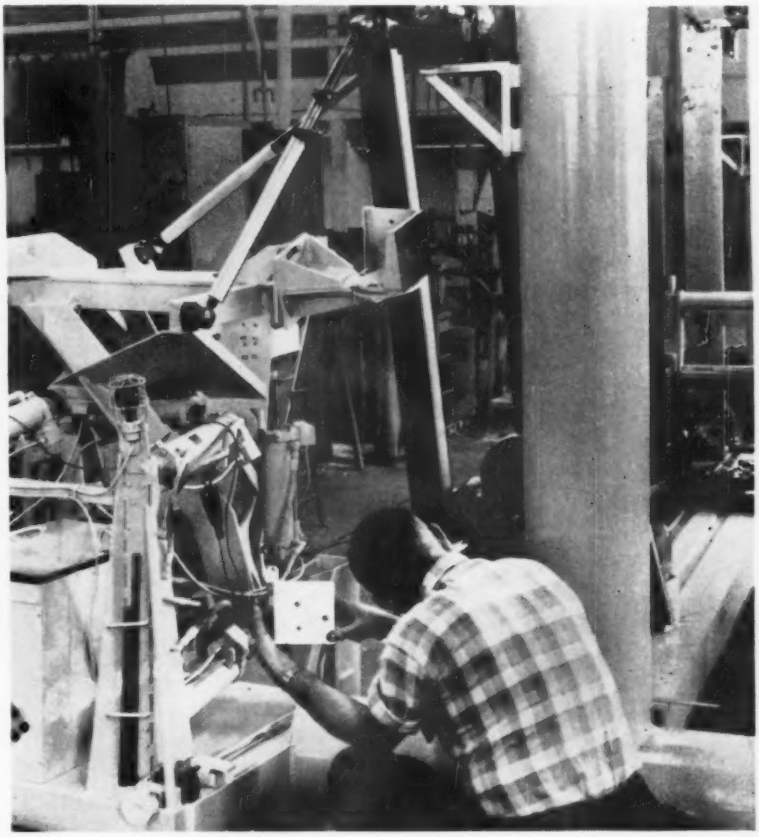
The company now produces primary aluminum and mill products. The reduction plant is at The Dalles, Ore.

A $35 million alumina plant will supply reduction facilities. The company will lay out another $45 million for a 60,000-ton-capacity rolling mill.

Michigan Buy—Harvey recently paid $3.6 million for the government's Adrian, Mich., aluminum wrought products plant. The company plans to double Adrian capacity.

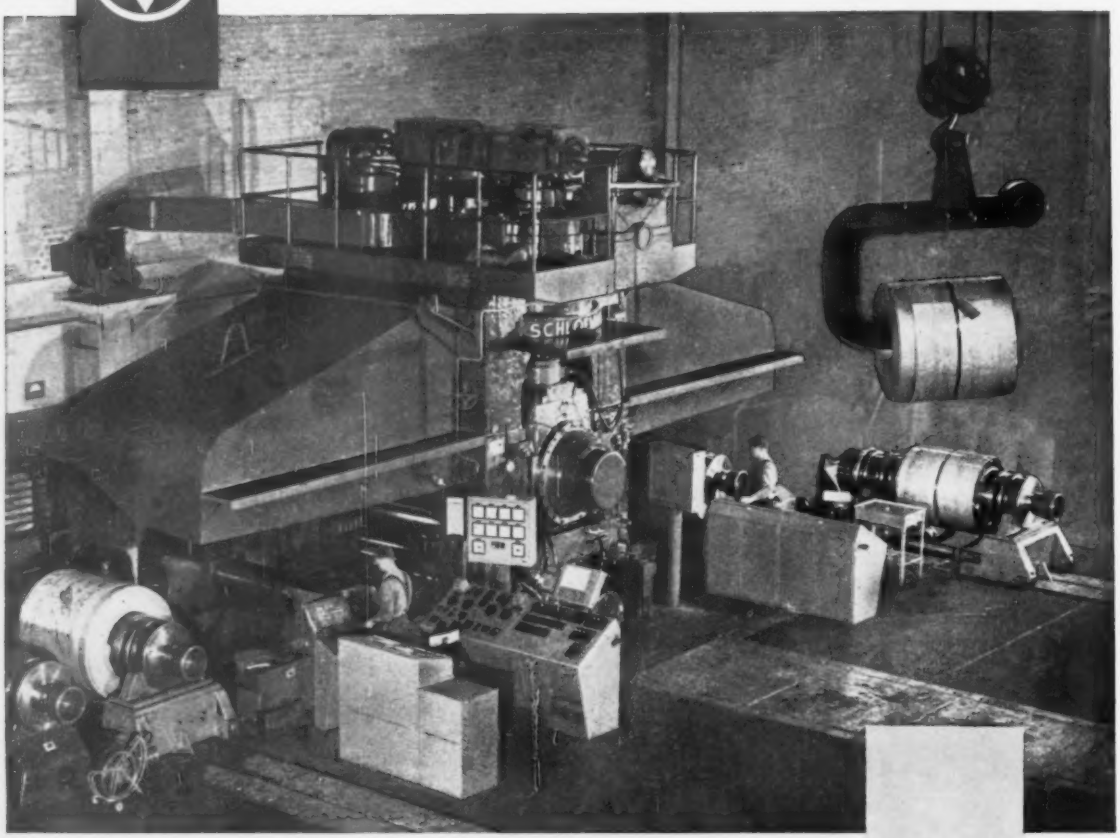
Lawrence A. Harvey, chairman, told The IRON AGE that he looks for tremendous industrial expansion in the nation over the next 20 years. "Scores of new applications for aluminum are constantly being developed. We want to be near our customers as the market for our products expands."

Aircraft First: Hydraulic Jig Positioner



TIME SAVER: This is the aircraft industry's first hydraulic jig positioner, developed by Lockheed Aircraft Co., Burbank, Calif. The new remote controlled portable device is reducing fixture-setting time by at least 80 pct.

SCHLOEMANN

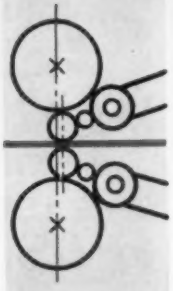


MKW mill rolling alloy steel strip 50 in. wide in a Swedish steel plant

MKW in Sweden

For the past three years an MKW mill in Sweden has rolled wide alloy steel strip. MKW rolling mills in Europe, North and South America today produce many thousands of tons of high-grade steel and non-ferrous strip every year. MKW mill stand designs are patent-protected. Constructed on simple lines they are thoroughly dependable. As small-diameter work rolls are used at high speed, large pass reductions and close tolerances are obtained.

MKW rolling mills can be equipped with four types of roll set-up (two-high, four-high, MKW and double MKW), and as a result their range of application is correspondingly expanded.



MKW roll set-up

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Toolmen Offer Tax Change Plan

It Has Payoff to Government and Business

Tool distributors oppose tax credit plan. But they offer a plan in turn—a simple amendment to present laws.

Small metalworkers would benefit from new proposal.
By R. H. Eshelman

■ Like almost everyone else, the American Machine Tool Distributors Assn. is opposed to President Kennedy's tax credit proposal.

But unlike a lot of other critics of the plan, AMTDA has an alternative proposal. And its proposal considers the government's need of revenue as well as industry's need of tax relief.

AMTDA's proposal is a simple one. It wants the present law amended to eliminate the $10,000 and six-year useful-life limitations. And it wants the initial allowance rate changed from 20 pct to 30 pct.

Appeal Made—In a statement made to Rep. Wilbur D. Mills (D., Ark.), chairman of the House Ways and Means Committee, AMTDA draws the picture of government benefit as well as industry benefit in a workable investment incentive plan.

"The metalworking industry, which accounts for nearly half of our industrial output," says the statement, "will respond and benefit. This is the same industry that supplies the military, space and atomic hardware.

"There is little doubt that a substantial part of the temporary revenue losses resulting from an investment incentive will be recovered in resultant cost reductions of military hardware. American business, defense-oriented as well as commercial, must modernize and quickly."

Credits Can't Work — The AMTDA contends that the tax credit proposal can't achieve the desired effect. It points out that an investment incentive must encourage taxpayers to spend more on modernization than they would otherwise. Also, it says such an incentive must be equitable, predictable, easy to apply and consistent with existing tax law.

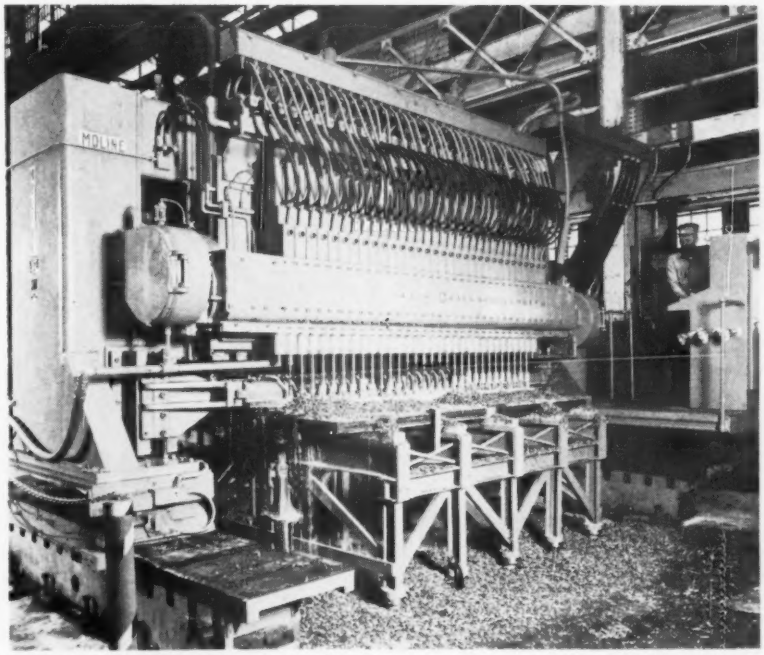
The association feels the Administration proposal falls short on all counts. Its own plan meets the needs and is streamlined, simple and easy to apply.

In exploiting the "easy to apply" aspect, AMTDA points to a Treasury study that shows small businesses are taking far less depreciation than are larger companies.

Small Companies—Says the association report: "It has been our experience that these smaller companies (over 18,000 in metalworking alone) are reluctant to explore the chance of tax savings if it would substantially increase the complexity of their accounting."

The report adds that complex tax credits would thus be "largely ineffective among the very group it seeks to aid."

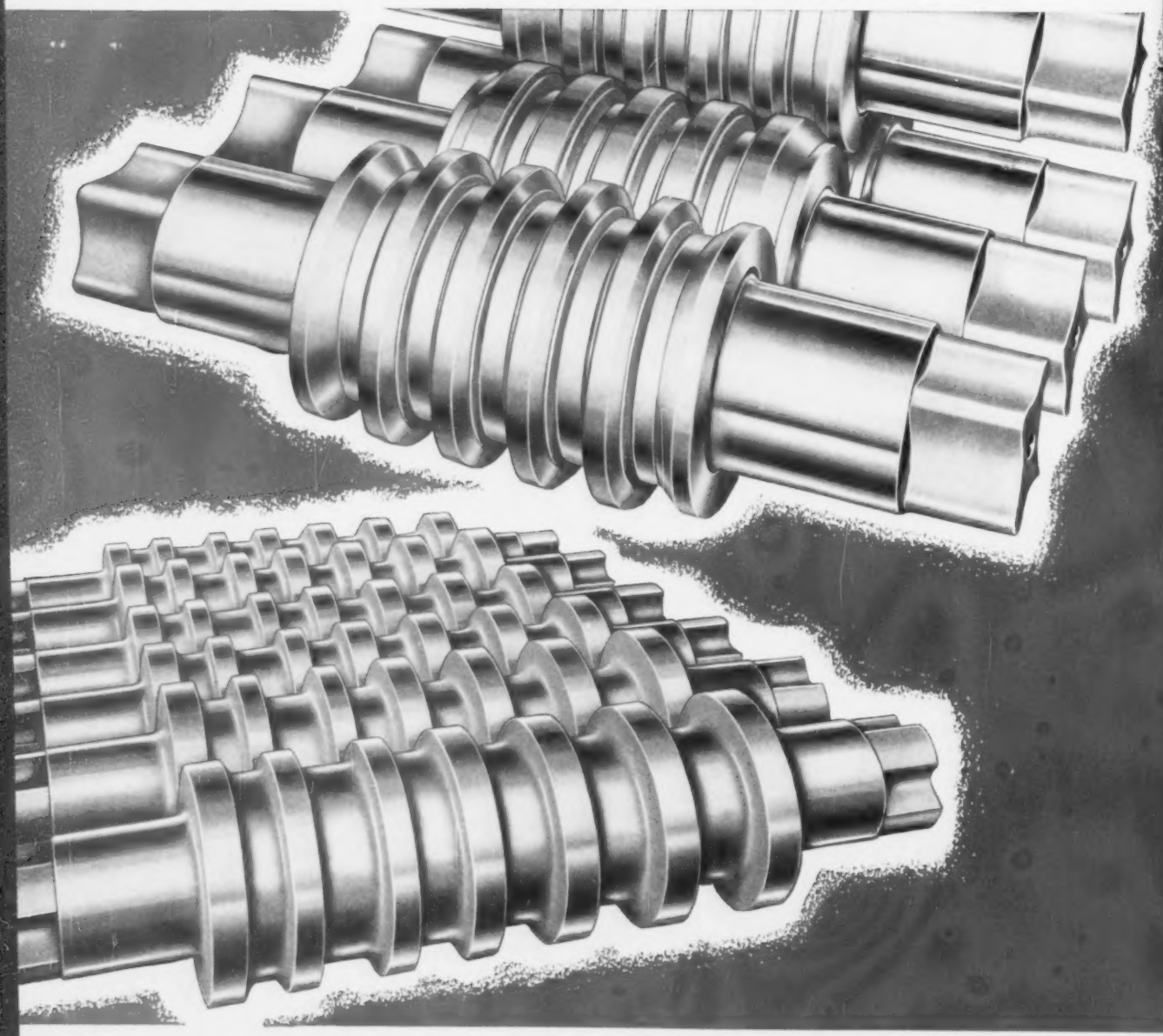
Big Multi-Spindle Drill Ups Production



NONE BIGGER: More than 2000 holes per hour can be drilled in three-quarter in. thick metal plates at Worthington Corp. The monster's 32 spindles can be positioned in any pattern. Builder is Moline Tool Company.

Ohio Rolls

Shaping Metal for all Industry



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R. K. Branscom, appointed vice president, industrial and public relations, Bethlehem Steel Co.

Republic Steel Corp. — **B. H. Brown,** named asst. district sales manager; **J. D. Broadhurst,** appointed asst. district sales manager, Cincinnati.

Armco Steel Corp.—**G. H. McClure,** named asst. manager, sales administration; **D. L. Hagedorn,** named asst. manager, central sales; **F. R. Ditmars,** named asst. manager, western sales; **B. F. Carothers, Jr.,** named asst. manager, eastern sales; **E. L. Singley,** named asst. manager, stainless steel products; **J. B. Rafter,** named district manager, Philadelphia.

Weirton Steel Co.—**William Gallagher,** named plant industrial engineer; **Ray Clifford,** named asst. plant industrial engineer.

Colorado Fuel & Iron Corp.—**C. C. Crawford,** appointed works manager, Pueblo plant; **W. M. Chappell,** appointed general foreman, coupling shop and heat treating unit; **Melvin Sumrall,** appointed asst. superintendent, seamless tube mill; **W. K. Jackson,** appointed general foreman, seamless tube mill's hot mill; **L. C. Hilt,** appointed superintendent, seamless tube mill.

Chicago Bridge & Iron Co.—**H. J. Clarke,** elected senior vice president, Operating Dept.; **S. C. Hamilton,** elected senior vice president, Contracting Dept.; **J. T. Horton,** elected vice president, research; **M. G. Mitchell,** elected vice president and manager, sales.

Westinghouse Electric Corp.—**S. R. Hill,** appointed central region sales manager, Air Conditioning Div.; **T. B. Simon,** named manager, room air conditioning engineering, Major Appliance Div.

Lear, Inc.—**A. F. Haiduck,** appointed vice president and general manager, Astronics Div.; **J. P. Brown,** appointed vice president and corporate director, marketing.

Pettibone Mulliken Corp.—**J. R. Noreen,** appointed manager, purchasing, Beardsley & Piper Div.

E. C. Koster, named chairman of the board, Vlchek Tool Co.

Proler Steel Corp. — **K. J. Schoeps,** appointed director, nonferrous operation.

Midwest Steel Corp. — **J. W. Bunker,** named asst. chief engineer, construction; **G. W. Sawyer,** named general supervisor, construction.

Dana Corp. — **S. L. Whitehall,** appointed special asst. to the general manager, Parish Pressed Steel Div.

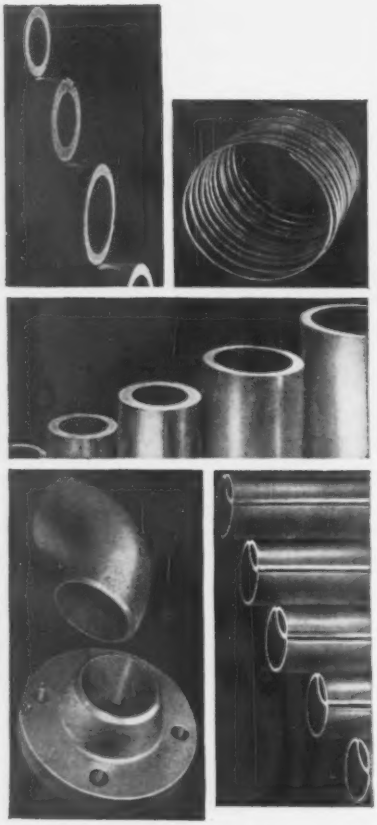
National Malleable & Steel Castings Co. — **D. F. Kittredge,** appointed asst. vice president, International Div.

(Continued on P. 58)

L. R. Miller, appointed vice president, manufacturing, Trent Tube Co.

E. F. Howard, named president, Tool Div., and director, Vlchek Tool Co.

J. R. Barefoot, appointed executive vice president, McKay Machine Co.



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(Continued from P. 57)

Champ Carry, named chairman of the board, Pullman, Inc.

North American Aviation, Inc. —**Dr. W. R. Laidlaw,** appointed manager, advanced systems, Space and Information Systems Div.

General Electric Co. — **T. M. Hushen,** named manager, New York Apparatus Service Shop; **D. P. Patterson,** named manager, Salt Lake City Apparatus Service Shop; **R. R. Bracchi,** named manager, Indianapolis Apparatus Service Shop; **D. M. Capito, Jr.,** named manager Louisville Apparatus Service Shop; **H. P. Bertoulin,** appointed manager, Birmingham Apparatus Service Shop.

R. C. Mahon Co.—**W. T. McCoy, Jr.,** appointed manager, regional sales engineering office, Chicago.

R. J. Kieckhefer, Jr., appointed vice president, administration and engineering, Litho-Strip Corp.

G. R. Lippert, appointed vice president, marketing, Federal Manufacturing & Engineering Corp.

American Brake Shoe Co. — **J. W. Stertzer,** named midwest regional product manager, Denison Engineering Div.

Clark Equipment Co. — **J. F. Bechtel,** elected executive vice president and general manager, Clark Equipment International, C. A.; **Fred Dolton,** appointed manager, national account sales, Construction Machinery Div.

H. K. Porter Co., Inc.—**R. O. Phillips,** appointed general sales manager, Disston Div.; **R. W. Brady,** appointed products sales manager.

P. R. Mallory & Co., Inc.—**C. A. Barnes,** appointed administrative vice president.

R. M. Thornton, appointed vice president, research and development, Litho-Strip Corp.

General Time Corp. — **D. P. Caverly,** appointed director, engineering.

General Tire & Rubber Co.—**N. M. Andrew,** named Charlotte district manager; **W. M. Hempel,** named manager, TBA Sales, and asst. manager, Passenger Tire Sales; **R. H. Lynn,** named manager, Passenger Tire Sales, Detroit; **L. L. Meyer,** appointed manager, Truck Tire Sales, Atlanta.

General American Transportation Corp.—**S. S. Kahn,** appointed president, Parker-Kalon Div.

General Dynamics/Electronics Corp. — **W. R. Rauth,** appointed manager, marketing; **Dr. Donald Wahl,** appointed manager, engineering; **W. S. Stroud,** appointed manager, industrial engineering; **H. L. Anderson,** appointed manager, quality control; **W. E. L. Boyce,** appointed manager, radar program; **R. C. Smith,** appointed controller; **J. L. Wheeler,** appointed manager, Rochester Operations, Information Technology Div.

Consolidated Systems Corp.—**P. S. Fogg,** elected chairman of the board.

Aluminum Co. of America—**P. I. Nielsen,** appointed development manager, machinery and equipment; **C. L. Burton,** appointed development manager, aero-space and military equipment; **D. B. Wood,** appointed manager, bearings development.

OBITUARIES

F. C. Heinen, vice president in charge of the New York office, Youngstown Steel Door Co., and Camel Sales Co., Ltd., and president, Camel Co., Ltd.

F. A. Whittall, 61, chairman of the board and president, Continental Can Co. of Canada, Ltd.

A. J. Jacobs, 73, board chairman, Detecto Scales, Inc.

M. F. Richter, vice president and manager, Steel Warehouse Div., R. C. Mahon Co.

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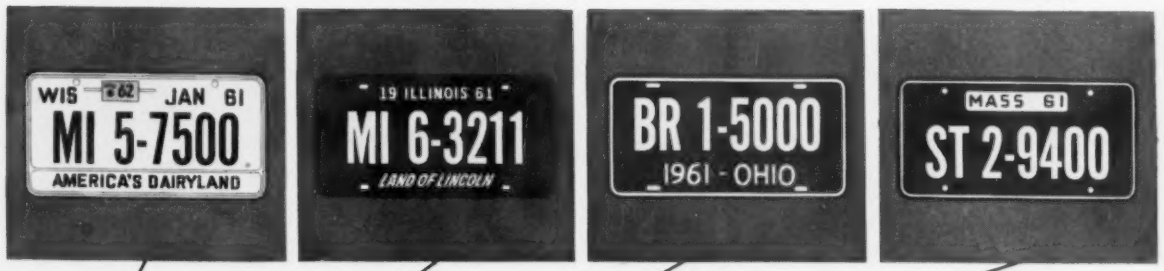

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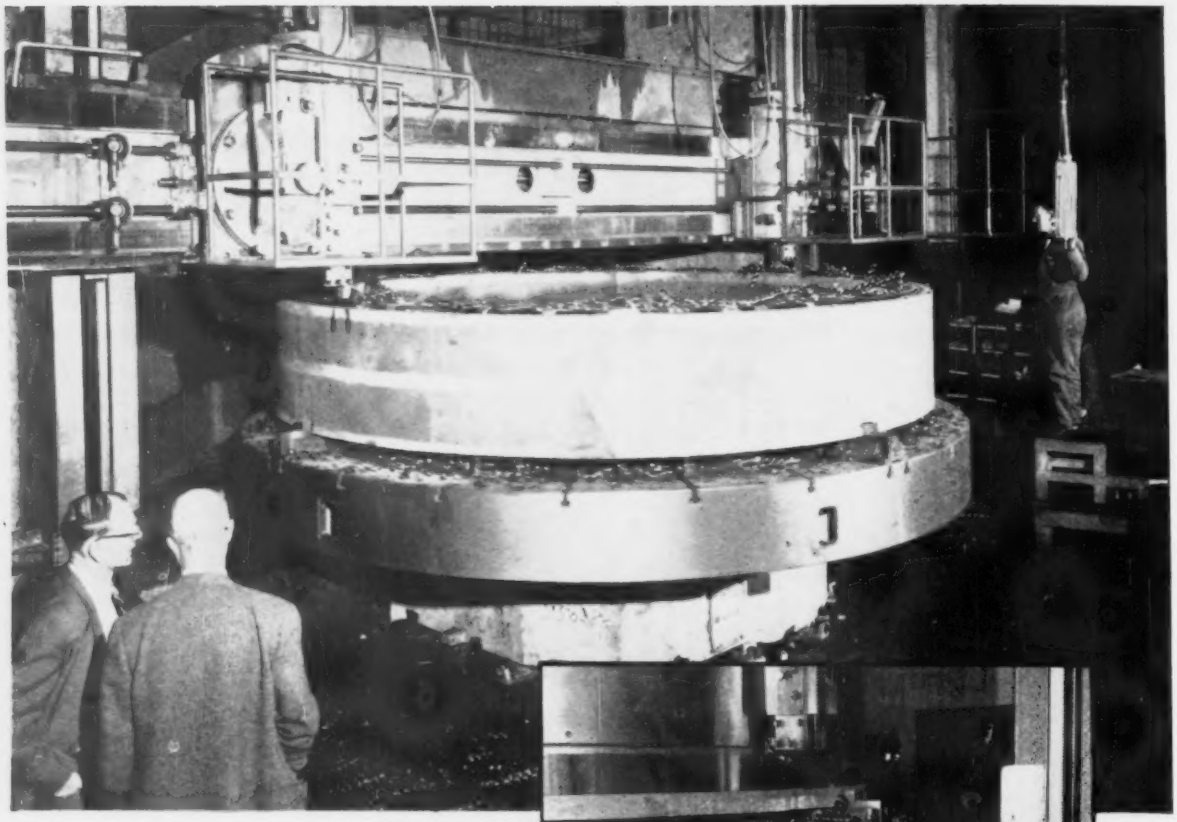

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Speedup Space Projects

The multi-million dollar space-budget hike sought by President Kennedy makes speedup of five civilian and military projects a certainty. The five projects to be pushed are: The solid-fueled rocket booster; the nuclear-powered booster; the Apollo spaceship for trips to the moon; communications satellites; weather satellites.

Moon Science Advances

Combining photographic, projection and other optical techniques results in highly accurate 3-D models of the moon. These models include the back side photographed by the Soviet Lunik, as well as the near side explored by telescopy. Models are revealing facts about topography, and dust cover. Studies will prove very valuable for manned landings and exploration.

Ripple-Free Windows

Photographing in front of giant, grid board to double check optical quality is the final step in Goodyear Aircraft's process for making aircraft windows. Windows for today's high-speed jets

DOUBLE CHECK: Passes grid-board test.

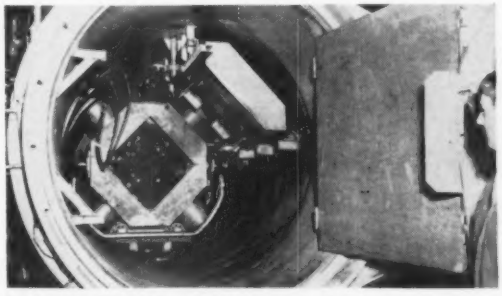
must be strong and free from ripples. Made from a stretched plastic, they will not shatter, and the puncturing object leaves a clean hole.

"Blasts" Drill Beryllium

Wherever complex configurations in either small or large diameters must be cut in exotic metals, more and more fabricators are looking at electric-discharge machining. Beryllium Corp., for example, reports that the technique saves both time and core material when machining beryllium. Another advantage of the process is that, regardless of size and configuration of the hole, there's no possibility of breakout of material on the side opposite the cut.

Space Shooting Gallery

To test materials for space flight, a unique evacuated test chamber can simulate conditions of outer space. In it, scientists will be able to fire tiny pellets, akin to meteorites or space dust,



SPACE SHOTS: Meteorites at 75 miles altitude.

at target materials. Through the open rear door of the chamber can be seen the target mount which is capable of imposing 100,000 lb stresses. A 10-in. evacuated "gun" barrel extends 30 ft out from the other end of the chamber.

Reflectors From Explosives

Explosive forming is continuing to attract attention for solving difficult fabrication problems. Next on the schedule for explosive forming at Ryan Aeronautical are giant radar reflectors—78 in. diam and 22 in. deep. Ryan expects to maintain contour and dimensions in tolerances of one or two thousandths of an inch.

Revise Patent Laws

Congress is again trying to make the patent laws of NASA more palatable to industry. The House Space Committee held hearings on bills to give NASA a royalty-free, irrevocable license to space inventions developed by private firms under government research contracts.

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Soldering Lines Go Automatic

High-Speed Units Turn Out Leakproof Auto-Cooling Systems

Automated welding machines are a common sight in an automotive assembly plant.

Not so common are automatic soldering units. These units improve quality, boost output and reduce assembly costs.

▪ It takes about 2 lb of solder to assemble and leakproof a new automobile radiator. Until recently, the assembly of these sweat-soldered radiator systems called for 90 pct handwork.

However, manual soldering leaves much to be desired. The quality of a hand-soldered radiator hinges on a fair amount of skill and lots of dexterity. Also, hand soldering is both tedious and tiring work.

Automatic machines are now taking over this tiresome task. These high-speed units, made by the Expert Welding Machine Co., Detroit, yield top-quality radiator systems.

Production Units—At 80 pct efficiency, the output from each radiator-soldering machine is 206 assemblies per hour. Other automated soldering units, made by the same company, turn out water-supply tanks for the car radiators. Output from each of the latter machines is 238 tanks per hour at 80 pct efficiency.

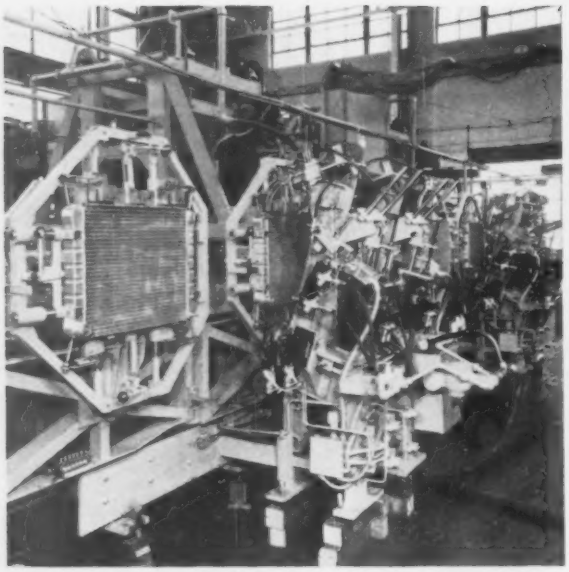
Let's study a radiator-soldering setup first. The automated machine solders two flow tanks and two support brackets on each radiator core. Versatility is a big factor. To handle different sized radiators, all fixtures are adjustable.

In setting up a work run, the operator simply positions a trip device to match a desired radiator size. This trip device contacts a limit switch. The switch adjusts solder-feed and heat-source controls. Both controls are lined up to match the programmed radiator model.

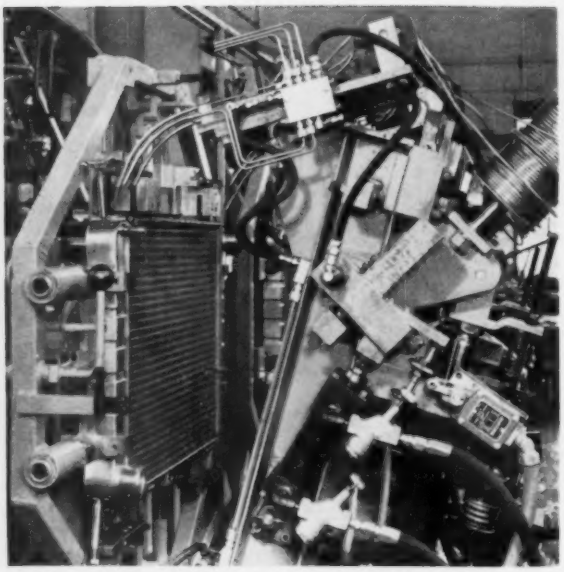
LOAD AND CLAMP: At the first station, the operator lines up a radiator core and two flow tanks. He manually clamps the assembly in place.

Closed Loop — Each radiator-soldering machine has 18 identical fixtures and 18 transfer stations. Overall machine measurements are 34 x 12 x 12 ft high. Pallet-mounted fixtures form a closed loop around the unit.

These fixtures are accessible from both sides of the machine. Pallet-



AROUND THE TURN: Partially-completed assemblies receive two support brackets as they index around the back of the radiator-assembly line. At 80 pct efficiency the machine turns out 206 assemblies per hour.



STATION ELEVEN: After both tanks are soldered in place, one of the support brackets is automatically sweat soldered on the radiator core. Then a turnover station positions the assembly for the other bracket.

guiding tracks insure a smooth, continuous and uninterrupted work flow. There are no sprockets in the drive.

A cam in the transfer system provides a 48-in. index in 2 seconds. Index positioning is held within 0.02 in. on any pallet in any work station.

Principal features of the index drive include: The rotating cam with a mathematically-derived continuous index; a dwell groove that's accurately machined around the indexing periphery; and a constant fixture speed.

Manual Loading — The motor-driven cam indexes the pallets through a series of cam followers. All cam followers are mounted right on the sides of the work-holding pallets.

To start the ball rolling on a new work run, the operator loads a prefluxed core and both its tank subassemblies into the first fixture. He manually clamps these parts in position.

The clamped assembly automatically transfers to idler station two. At station three, one tank is soldered to the radiator core. Gas burners heat the assembly to proper soldering temperature. Then the solder wire feeds to the joint positions on the tank's core. Nineteen all-mechanical feed rolls control the solder's flow rate.

As the solder contacts the heated assembly, it flows around the joints. Gravity and capillary action produce leakproof sweat-soldered assemblies.

Quick Turn—Cooling takes place at the next station. Then the holding fixture moves along to station five. Here, a hydraulically-operated actuator turns the fixture 180°. After rotation, a spring-loaded locking device aligns the fixture's radial position.

Inside station six, the second tank is soldered to the core. The next station serves as an idle-cool stop. And at the eighth transfer station, the fixture is rotated another 90°.

Moving through a third idler station, the partially-assembled radiator enters station ten. At this station, one support bracket is manually loaded in the fixture. Clamps hold the bracket against the radiator's core.

Sweats On Bracket—Both ends of the support bracket are automatically soldered to the radiator tank in station eleven. As the fixtured assembly enters this station, a size-trip device actuates a limit switch. This switch positions the solder-feed and heat-source controls to match the work run.

Again, gas burners heat the work to the proper soldering temperature. Then the solder wire feeds to the joint positions. As soon as the solder contacts the hot metal, it flows around the joints.

At the twelfth station, the assembly rotates a full 180° and some cooling takes place. Indexing into the next station, the fixture receives the second support bracket. This bracket is manually loaded and clamped on the core.

Completes Assembly—The second bracket is soldered on the radiator's tank inside station fourteen. This final-soldering station oper-

ates in the same manner as station eleven.

With all soldering work done, the completed assembly transfers to station fifteen where it rotates 90° to facilitate unloading. Moving through an idler station, the assembled radiator enters the unload station.

Unloading at station seventeen is done manually. The last station can serve as an extra idler, unload or load station.

At two of the plants where these radiator-soldering machines have been installed, quality-control standards call for a minimum of 0.2-in. solder penetration on the flow-tank joints. Minimum solder penetration under the support brackets' lap joints is 2½ sq in.

Tank Soldering—Now, let's study the supply-tank soldering machines. Each unit has sixteen rotary-indexing stations. Soldering of all water connections and brackets occurs in five working stations.

As with the radiator machines, versatility is a prime feature of these supply-tank assembly units. All fixtures and soldering stations can be manually adjusted for different tank models.

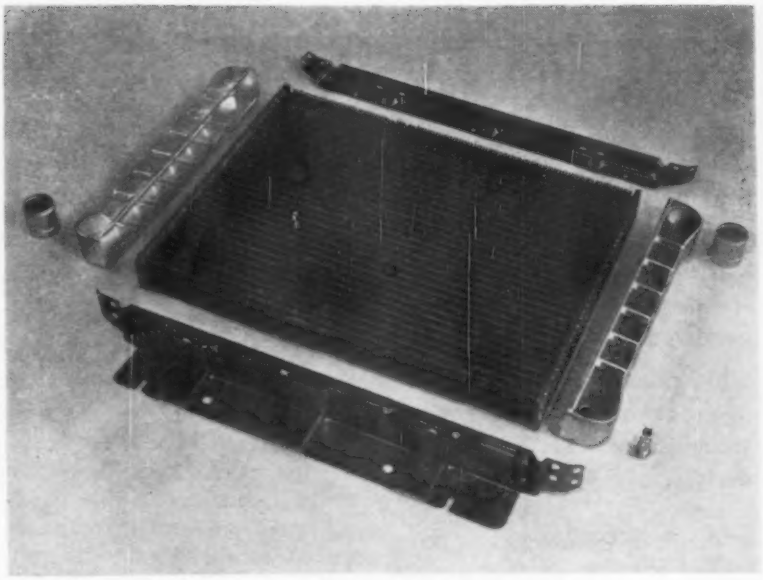
An operator loads prefluxed supply tanks, water connections and brackets in the fixtures at the front of the machine. These assemblies index through the soldering stations.

Easily Altered—During each soldering operation, gas burners heat the joints to the proper temperature. Then solder wires feed to the proper positions. As the solder contacts the hot metal, it sweats around the joints to seal each assembly.

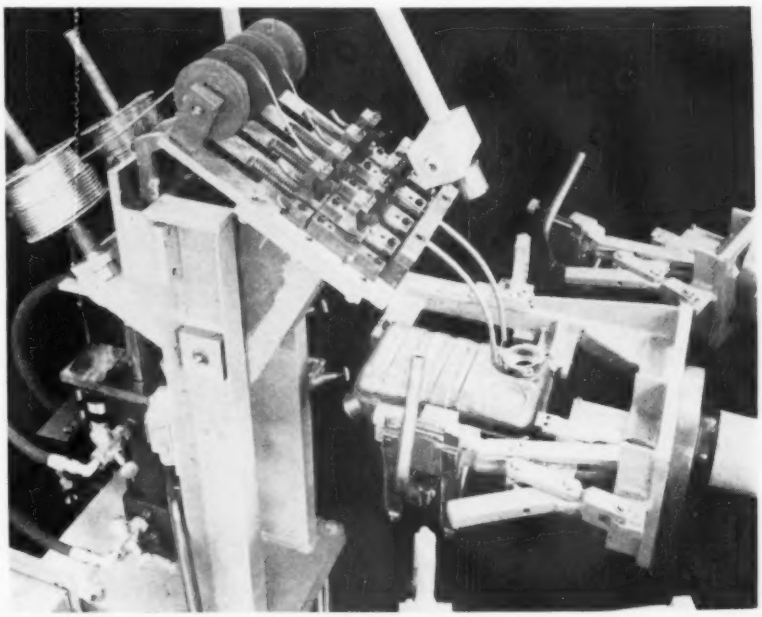
Indexing positions around each machine are controlled by a cam with a rack and gear arrangement. As the fixtures index into the various stations, progressive-assembly and cooling stages serve their purposes.

Each fixture and all soldering stations have interchangeable positioning locks. When altering the setup for a different tank model, the stations are manually rearranged.

Aside from the fact that the new machines are boosting production rates, they are also meeting much higher quality-control standards than were realized by the old trial-and-error manual methods.



NO LEAKS ALLOWED: Two tanks and two support brackets are soldered on each core. Minimum solder penetration on each flow tank is 0.2 in. Each sweat-soldered lap joint on the support brackets covers 2½ sq in.



SUPPLY-TANK LINE: Five soldering stations complete assembly of water-supply tanks for radiator systems. Output is 238 assemblies per hour.

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Salt Bath Promises Low Alloys New Horizons in Design

A new method of salt bath treating gives low-alloy steels both wear and fatigue strength.

The process allows the use of low-cost metals heretofore thought unsuited for certain designs.

■ Tufftriding is a new process that's helping American engineers in their never-ending search for ways to make better products. The process opens new areas of approach to products that require wear resistance and fatigue strength.

This new heat treating process, developed in West Germany by Degussa-Durferrit, was adapted for use in United States and Canada by Kolene Corp., Detroit.

Because Tufftriding forms nitrides on ferrous metals, it is classed as nitriding. But the similarity ends right there.

Already Scoring—Where costly steels are considered a must for a given job, Tufftriding, in many cases, offers the designer a chance to try the cheaper low-alloy steels.

The process has already found uses in hydraulic parts for increasing fatigue resistance. On airplane landing gears, it ends galling. Machine-tool people find the process extends service life of costly punch and die setups, and almost triples forging-die life.

In addition to the uses adopted on a production basis, thousands of individual parts have been treated by Kolene for test purposes. For many of the parts tested, Tufftriding improved more than one characteristic or property.

Simple Setup — A molten-salt bath, operating at 1000°-1050°F, is the backbone of the process. At this temperature, the salts become a viscous liquid. The bath is made up of two principal components—potassium cyanide (KCN) and potassium cyanate (KCNO).

When in contact with ferrous metals, the salt decomposes and liberates carbon and nitrogen. Since nitrogen is ten times more soluble than carbon in ferrite, carbon quickly forms iron carbide (Fe_3C) particles at the part's surface.

The iron carbides act as nuclei; the nitrogen precipitates at the surface to form a tough, ductile compound layer of iron nitrides (Fe_3N and Fe_4N). The brittle Fe_2N does not form.

Dry air, pumped through the molten salt to provide free oxygen, promotes the reaction. As the treatment progresses, excess nitrogen diffuses deeper into the base metal to form a diffusion zone.

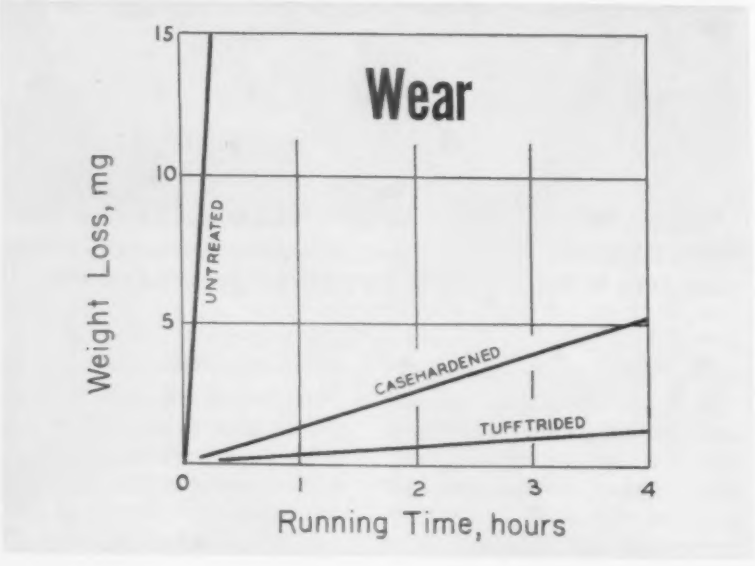
The diffusion zone extends beyond the compound layer to a depth of 0.015-0.018 in. It is this free nitrogen that stops incipient cracks before they can progress to the surface and become fatigue cracks. It also increases the material's bend strength.

How Does it Wear?—The compound layer of iron nitrides provides wear resistance, anti-galling, corrosion resistance and hardness—all of which stem from the one process. The hardness can only be measured with a microhardness tester.

With Tufftriding, bath control is easy. At the start of the day, sludge is removed from the salt tank and a simple chemical check is run. To maintain correct concentration of the bath, measured amounts of salt —rich in KCN or KCNO, or both —are added in egg form to bring it up to the correct operating volume.

To minimize sludging and con-

Treated Steel Resists Abrasion



tamination, parts are cleaned to remove grease, oil, water and dirt. No other part preparation is necessary. Preheating larger parts to 700°-800°F prevents wide temperature fluctuations in the bath.

No Distortion — Low temperatures and short cycles are important in maintaining product quality. The standard process cycle will not distort the workpiece. Since Tufftriding results in a metallurgical change only, parts do not "grow." Threads, keyways, splines, holes and slots retain their shape and size. Thus, the process can be used on finished parts.

Since the treated surface is ductile, stop-off protection isn't necessary for threads and areas where bends will be made. What this process does for hardness, wear resistance and fatigue strength can be seen in the charts.

On the average, fatigue strength of low-carbon steel is increased 80 pct. Medium-carbon-steel fatigue strength rises 60 pct, while low-carbon, chrome-manganese steel gains 30 pct after treatment. For chrome - alloyed medium - carbon steel, hardened and tempered before Tufftriding, the fatigue strength gains about 20 pct. This is also the case for cast iron.

Time Trials — Service lives of SAE 1046 steel diesel-engine crankshafts have been lengthened by Tufftriding them at 1050°F for 150 minutes. Fatigue life of the parts has been raised 70 pct.

Tested after actual operation, Tufftrided camshafts show a big improvement over case - hardened shafts. The 0.16 pct C, 1.20 pct Mn, 1.00 pct Cr shafts were driven 62,000 miles. While the Tufftrided part looks like new, the case-hardened sample shows excessive wear on the gear and a pronounced fatigue pattern on the cam. In another test, Tufftrided gears were operated in trains for over 5000 hours, yet showed no sign of wear.

Tested on camera shutters and other parts where lubrication is difficult or impossible, the process extends service life and prevents sticking or galling.

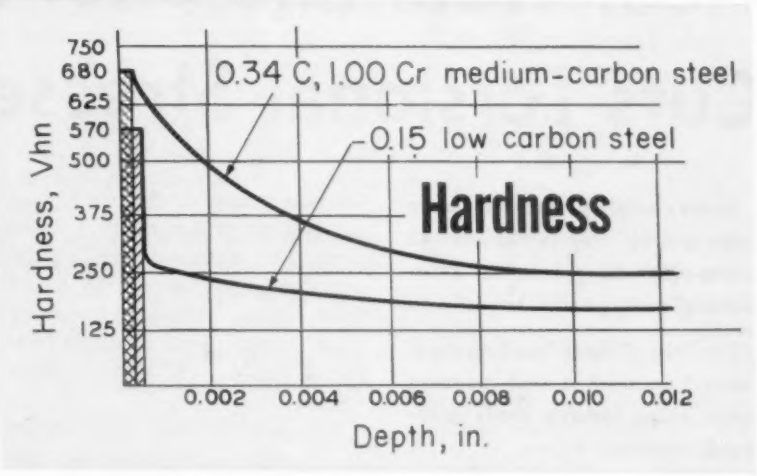
Improved Tools—Tufftriding improves tools used to process parts. For example, Tufftrided trim dies show a 25-pct increase in parts produced.

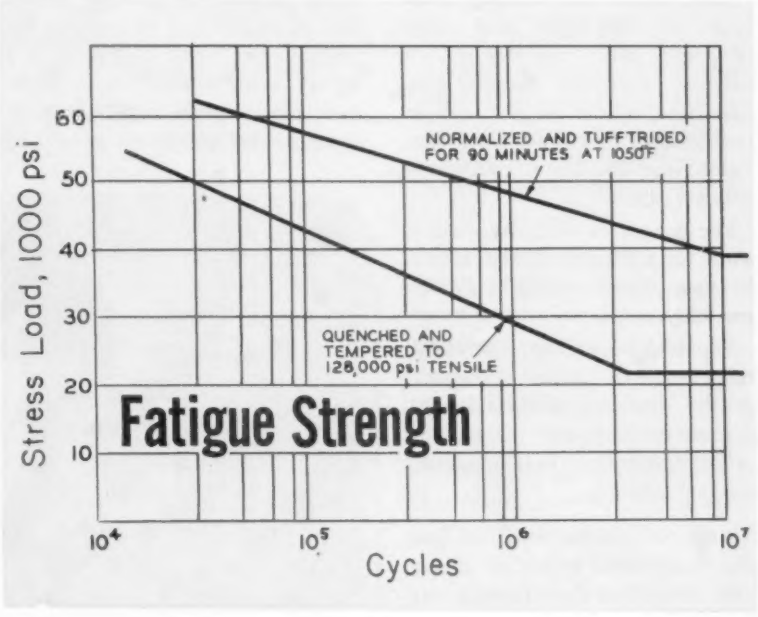
Hot-forging dies of 5-pct chrome air-hardening steel have increased production from 50,000 to 130,000 pieces after treating. A treated high-speed steel thread-cutting die has gained life between sharpenings.

Cutting life of high-speed steel saw bands increased 50 pct after processing. Aluminum-forming tools made of tool steel were Tufftrided at 1000°F for 15 minutes and air cooled. Production climbed 38 pct and problems were minimized because of the reduction in galling.

A 4150-steel punch, replaced by a Tufftrided high-speed steel tool, boosted production 400 pct. Savings in down-time costs permitted throwing the tool away rather than sharpening and re-Tufftriding it.

Process Affects Properties





Heat-Treat and Shot-Peen Cycle Cuts Torsional Stresses

Shaft-making methods have come a long way in the last 40 years—just to meet the automakers' horsepower needs.

The "right" heat treat method, backed up with a shot peening cycle, helps today's shaft withstand torsional stress.

■ More than a half century spent developing "the right" steel alloys for power shafts provides today's designers with the answers they must have. Shafts put to work in transmissions and drive assemblies always face one major problem—torsional stress.

The control of torsional stress is being solved, however, by factors that have almost nothing to do with new alloy steels.

Republic Steel Corp., Cleveland, feels that the factors responsible for the improved torsional-stress progress are improved design, new carefully-controlled heat treatment and shot peening.

Why So? — Improved designs help to distribute operating stresses while controlled heat treating and shot peening raise the shaft's torsional strength.

Motor vehicles present the toughest test for power shafting. Here, power loads delivered to drive shaft and rear axle have increased eightfold in the last half century—even more since alloy steel was first used for the job.

The parts themselves have not felt size or weight gains. Drive shafts must stay slim because automobile design has brought cars nearer to the road.

Over-all Treatment—In the '30's auto axles and shafts were either not heat treated or they were given an over-all prolonged heat treatment. This hardened them all the way through. What was the result? Solid shafts, although possessing great strength, were relatively brittle and had low resistance to fatigue stresses.

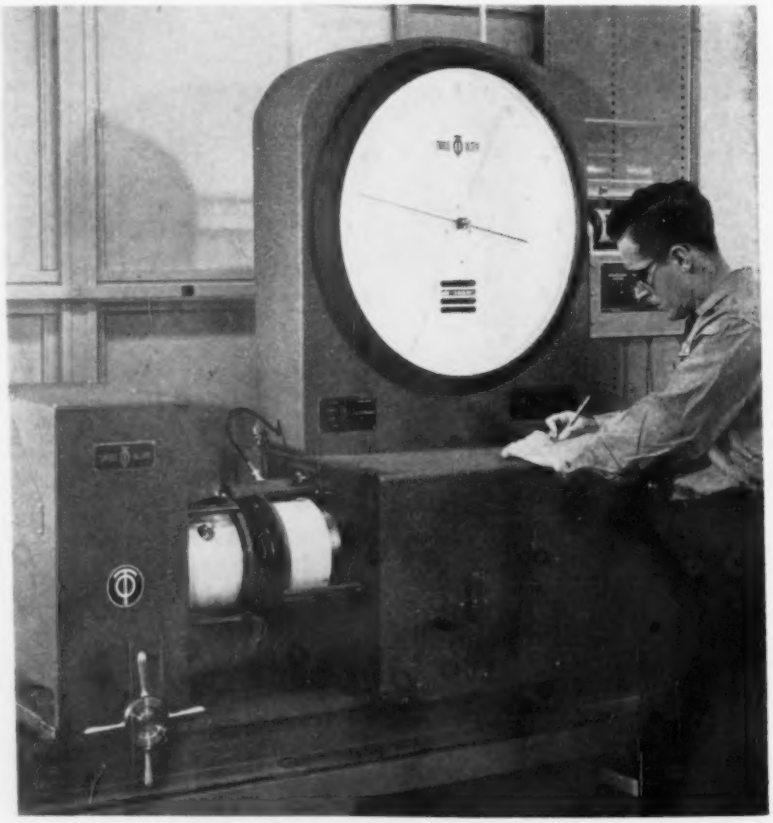
The poor residual stress pattern at the high hardness levels often served to aggravate service failures.

For larger power shafts, where size and weight pose no problem, the solution was found in heavier and thicker components. The ultimate was reached with giant propeller shafts for battleships.

Some seagoing shafts are 36 in. in diameter and 60-ft long. So vast is the power they handle, that thrust caused them to twist as much as 45°.

Auto Needs—"Beef" is no solution for motor vehicles. Thus, engineers turned to hollow driveshafts and found that these stood up better than solid ones of equal weight. This was due to the more effective distribution of the metal.

Hollow shafts could not be used for rear axles. They ran into limitations for drive shafts, too, as engine power continued to rise. But they



TWISTED STORY: Torsion-test machine checks shafts to determine the number of reversals required to cause a failure. Some direct powershaft applications handle thrusts that cause them to twist 45°.

demonstrated the advantages to be gained from the more effective distribution of metal and how it could be used to avoid increasing weight.

In developing steel to meet the increasing torsion-stress challenge, sample shafts have been given tests far more strenuous than they would receive on the highway.

In the '20's and '30's, with horsepower ratings at 90 or less, the sample would break down after 3,000,000 "reversals" — meaning sharp reversals of direction, under load, in the test stand.

Metallurgists and engineers worked out heat treating methods which improved the shaft's resistance to impact loading and fatigue failures. Such over-all properties can be further augmented through controlled shot peening operations.

Faster Fifties — The 6,000,000 "reversals" logged on torsion tests by the selectively heat-treated axles provided the answers to almost all higher-power autos. However, some engines came forth in the '50's with such tremendous power that auto engineers shuddered. What was the answer here? Shot peening.

Peening "work-hardens" the surface, in a manner similar to the strength-producing effects of forging.

From a showing of 6,000,000 reversals on the torsion-test machine, identical, sample axles went on to 8,000,000 reversals before failing.

Present-day, selective heat-treating and shot peening procedures are the products of many studies and test projects which go back through the years. The studies ranged from work on slender shafts for fractional horsepower motors installed in missile control systems to heavy shafts for giant high-speed turbines.

Safe Shafts—For the small shafts, as used in highly precise, gyro-control systems for missiles, the crucial test takes the form of rapid acceleration—up to 15,000 rpm. For the high-speed turbine, the challenge to the shaftbuilders has been to prevent disruption at high-speed operation.

Turbine shafts range from 4-36 in. in diameter. While there have been few accidents in recent years, turbine shafts were prone to fly apart at the tremendous rotating speeds of full operation.

For the whole field of power shafting, the fund of metallurgical knowledge has brought shafts back into use many times from the scrap-heap. As one example, in steel rolling mills, a single electric motor once served to drive the upper and lower rolls of the mill through gear boxes.

Today's shafts have greater torsion-stress resistance. A separate electric motor direct-drives each roll.

But the greatest change has come in motor vehicles. Once, axle and driveshaft failures in auto, bus, or truck, were common. Today, it's an oddity.

The future for power shafting is promising. Even with inexpensive alloys, shafts may move in and take jobs away from gear trains.

Resumé of Present-Day Shaftmaking

1. Alloys that meet today's power-shafting demands:

AISI 5160	AISI 4150
AISI 9260	AISI 8660

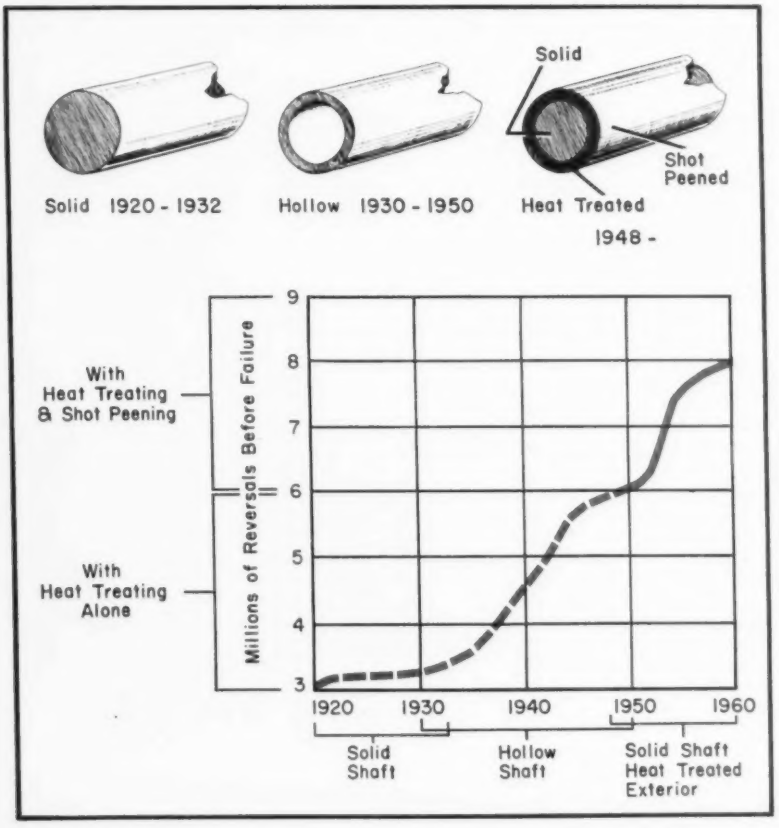
2. Standard heat treating methods:

   a. Localized induction hardening
   b. Flame hardening

3. Surface-hardness range recommended for shafts:

   280-350 Bhn

Check Power-Shafting Progress



Research Attacks Seal Leakage

Three-Step Approach Unveils Failure Causes

The old saying that a good seal is a tight seal just isn't true. Spadework in this field reveals many causes for leaks.

Seal technology is getting to the very roots of the problem.

■ What is the main cause of leakage in a shaft seal? Many engineers will still say that the seal itself failed to hold up. To locate the trouble, you must actually run through a checklist of three items. It could be the shaft. And did the shaft get rough handling en route to final installation? Thirdly, there's the seal.

The fact remains that many leaks are caused by slight defects in the shaft. Trouble can crop up if any of several traits become excessive. The traits include surface roughness, machining lead, microscopic cracks, out-of-roundness and runout.

Suppose a production motor shaft has just been produced. The surface of this shaft meets the prescribed specification of 10-20 microinches. During assembly, however, the shaft picks up a few nicks and scratches. Then there is room for leakage.

Science of Seals — About four years ago General Motor's Corp.'s Research Laboratories in Warren, Mich., began digging into this overall problem. The result is that seal technology is starting to move from the realm of the unknown into a science.

This engineering team regards a lip seal as a precision-built assembly and not as a piece of flexible material used to plug a hole around a rotating shaft. As a result, the lip seal must have the surface finishes, fits and lip pressures needed to maintain a lubricant film between the mating surfaces.

A shaft that is too smooth and is fitted with a tight seal just won't sustain a lubricant film. On the other hand, a shaft that is too rough will tend to abrade the seal lip.

Torque Factor — Shaft surface finish can also affect torque. If you increase the lip pressure, doesn't it stand to reason that the oil films will become thinner? In such a situation higher torque will be required.

A good seal on an out-of-round shaft might perform very well at slow speeds. Increase the speed, though, and a standing gap is apt to form between seal lip and the shaft.

As far as assembly is concerned, here is a step that can only be perfected through quality control. Next to the shaft problem, no other factor creates as many leakage problems as this operation.

Years of Research—Of course, the seal is the main target of research by the GMC group. The reason that seals did cause leaks was due to the fact that no one knew enough about them to keep them from leaking in the first place. Now the evidence is piling up.

A typical lip seal is simple enough. It consists of a ring-shaped case, flexible material inside the

FAST CHECKOUT: Automatic unit can check more than 600 seals per hour for lip diameter, concentricity and lip pressure.

case and a garter spring which hugs the lip. The main variables in the seal are lip diameter, lip pressure, eccentricity and material quality.

Here is some evidence on lip diameter. What determines lip diameter? It's established by trim diameter and spring tension. Tests show that the smaller you go in lip diameter the more frictional drag is developed on the shaft. On these tests, however, all of the seals started out with the same lip pressure.

Joule Effect—The drag is caused by what is called the Joule effect on the rubber material. Certain rubber compounds under tensile stress will shrink when heated. Once you mount a seal on a shaft, the lip will stretch. If the diameter is too small, the lip will definitely shrink as a result of the Joule effect.

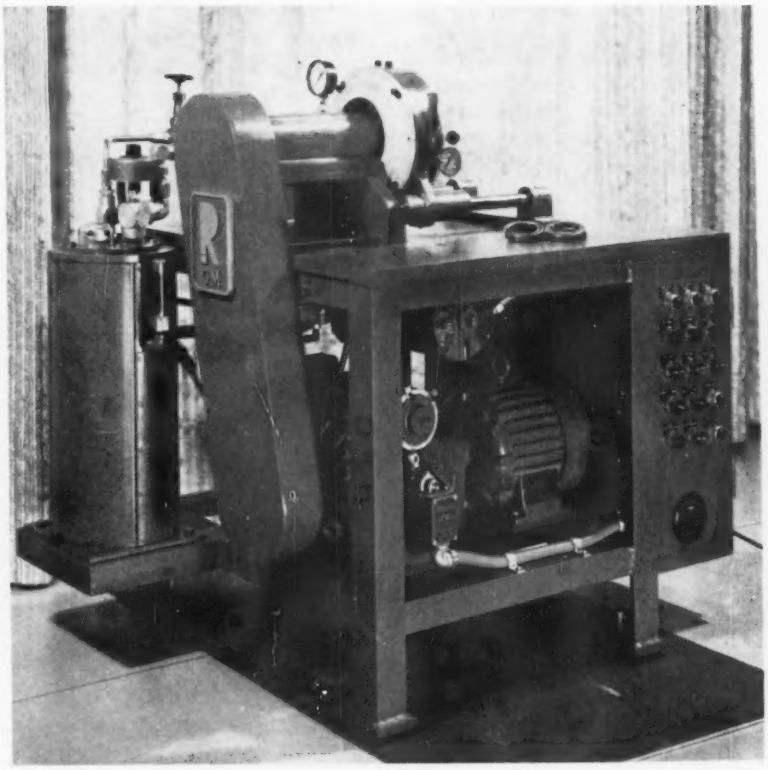
Lip flutter can also result by decreasing the diameter without changing the pressure. What happens is that the lip keeps repeating a cycle whereby it grips and releases the shaft. Before long, the lip becomes seriously damaged.

Flutter of this kind can take place even up to 1600 cps. It will continue after that on a wide range of shaft speeds: From the hundreds to the thousands in revolutions per minute.

Makes a Difference—Lab studies reveal that a seal with high trim intereference and moderate lip pressure running on a smooth shaft (2 microinch finish) created lip flutter and high torque. As soon as the seal was moved to another section of the shaft, these conditions stopped.

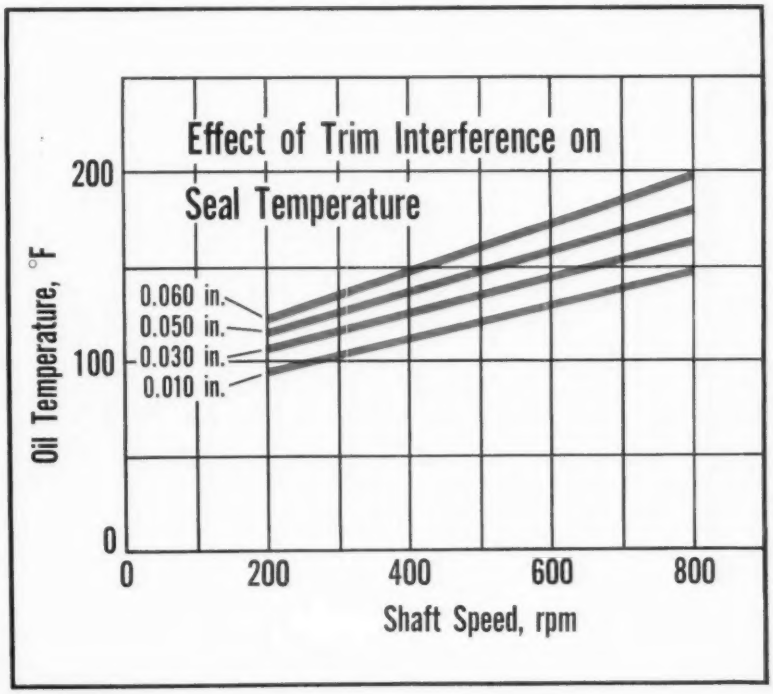
At the second station, the finish was rougher. It measured about 10 microinches. The answer lies in the fact that a surface that is too smooth won't support oil films at high tip pressures.

Other problems are involved in lip pressure. If you increase this pressure, you also increase temperature. Shaft torque and required



TEST CYCLE: Unit duplicates seal running conditions such as endurance, acceptance, and performance testing of lip seals. The machine simultaneously checks two seals of different sizes up to 10 in. in diameter.

Trim Interference a Factor



horsepower also tend to go up.

Raw Materials—The hardness of seal material has a great effect on temperature and the manner in which a seal operates. When the material is too soft, a hydrodynamic film is likely to build up. On the other hand, high hardness might develop only a narrow contact path, too narrow in fact to sustain a simple oil film.

You have to be careful when the assembly is running under humid conditions. Failures have been traced to shaft corrosion. The rust is developed by some agent in the seal. It's best to apply neutralizing greases to the new products on the shelf.

At General Motors Research, two basic machines have been developed which cope with the problems in seal design and performance. One is called the Sealector. This unit measures various seal parameters The other machine, the Sealrater, evaluates seal performance.

How It Works—The Sealector is used during high-volume production to control such variables as seal diameter and lip pressure. The machine is really an air gage. It is so designed to reveal seal lip diameter by comparing (at standard pressure) mass flow.

Consider a seal lip that is concentric to the shaft and has a diametral clearance of a few thousandths of an inch. An air flow of 10,000 cc per minute will then occur through the orifice. The system is very accurate. For example, gaging of seal lips can be controlled in increments of 0.005 in. on the diameter.

To control lip pressures, the same basic system is used except for the fact that a mandrel of shaft size is employed along with a cam-operated regulator. First, the seal is clamped over the shaft. Then the air pressure is raised by means of the cam.

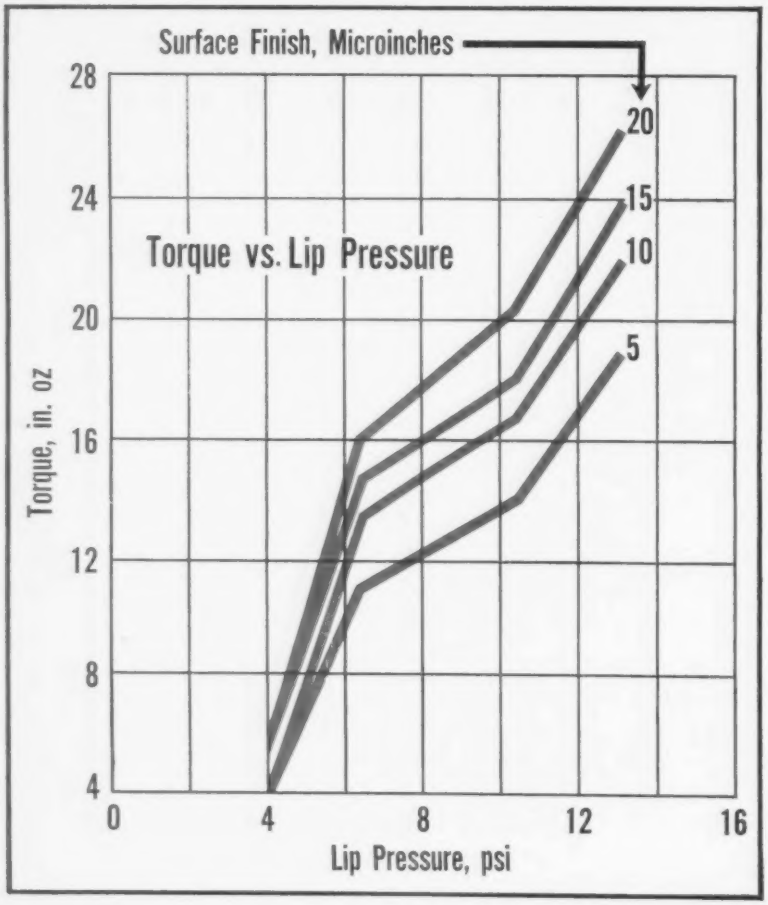
Pressure Reading—The pressure keeps going up until the lip seal expands away from the shaft just enough to cause a small flow. At this point, the lip opening pressure is read. In a production seal, this reading reveals many traits of the seal section.

Radial pressure on a seal lip isn't uniform. The pressure reading is that pressure exerted by the weakest part of the lip. A normal production distribution for a given seal design will vary from one-half to several pounds. As long as diameter limits are maintained, satisfactory operation is insured.

Where Leakage Originates

In the Shaft	it could be surface roughness or machining lead
During Assembly	from nicks, burrs or scratches
In the Seal Itself	look into lip diameter, lip pressure, eccentricity or perhaps even material quality

Rougher Shafts Up Torque



Lift Trucks Handle Odd Jobs

Lift trucks can be just a standard moving implement—or they can be equipped with devices to handle many jobs around the shop or factory.

Here's a company that designed attachments for many needs.

■ For almost 40 years, Greenlee Bros. & Co., Rockford, Ill., has made electric trucks an integral part of its operations. Through the years, the company has engineered a few additions to the lift trucks which makes them even more valuable to the machine makers.

These additions include controls systems, fork attachments, battery handling, and battery room techniques.

The 25-truck fleet operates over a 27-acre plant area. They range in capacity from 1000-7000 lb. A sweeper and four personnel carriers are also part of the fleet.

Better Service—A simple and effective system dispatches trucks in the machine shop division. Formerly, five trucks cruised at will and were directed to specific urgent moves through the plant telephone and public address system.

This practice put a heavy load on the telephone system. Call delays were frequent. Often, all five operators would respond to the public address order. Now, trucks are summoned by a system of red lights strung throughout the machine shop.

When the dispatcher receives a move order, he places a move ticket on a hook on a wood board and switches on the string of red lights. A free truck operator, wherever he may be in the plant, travels to the board and reads the instructions.

The driver then places the ticket on another hook under his truck number and answers the call. He switches off the lights indicating to other truck operators that the call has been answered.

SPECIAL DESIGN: Greenlee built a fork attachment to handle chip bins. The trucks also serve as mobile cranes when hoists aren't available.

Lends a Hand — Two electric trucks, assigned to the foundry, help charge the cupola. Steel charging buckets are set under chutes and loaded with 2500 lb of limestone, scrap metal, alloying agents and coke. The truck then positions the bucket for its ride to the charging floor by way of a crane.

Greenlee designed and built a special fork attachment to help handle chip bins. The device rests on the forks with its four hooks engaging the lifting eyes on the bucket. Two conical tips at the end of the forks position a pallet or skid.

The operator places the end of one of the forks under a pallet, raises the fork so the tip bites into the pallet and pulls or pushes it into position for lifting. The replaceable tips are held in place by cotter pins.

A Handy Crane—The forks also have two holes just behind the tips. A steel bar, with a hook attached, is pinned across the forks through the holes. With this device in place, the fork-lift truck acts as a mobile crane. It's used to service machine tools when an overhead hoist is not available, or when the piece being handled is too heavy for the hoist. With the same bar and hook the truck pulls trailer trains.

Truck batteries are charged, cleaned and maintained in a central battery shop. They are charged during the night while in the trucks.

Hand trucks do not come to the battery shop for a charged battery. These trucks are assigned to a specific area. When a truck needs a fully charged battery, the battery shop sends it via a fork-lift truck. This way, several battery exchanges are made on one trip.

How Creative Stamping Design Can Effect Stock Savings

By **Federico Strasser**—Consultant, Santiago, Chile

How much scrap is left over from your stamping operations? Why not put this material to productive use?

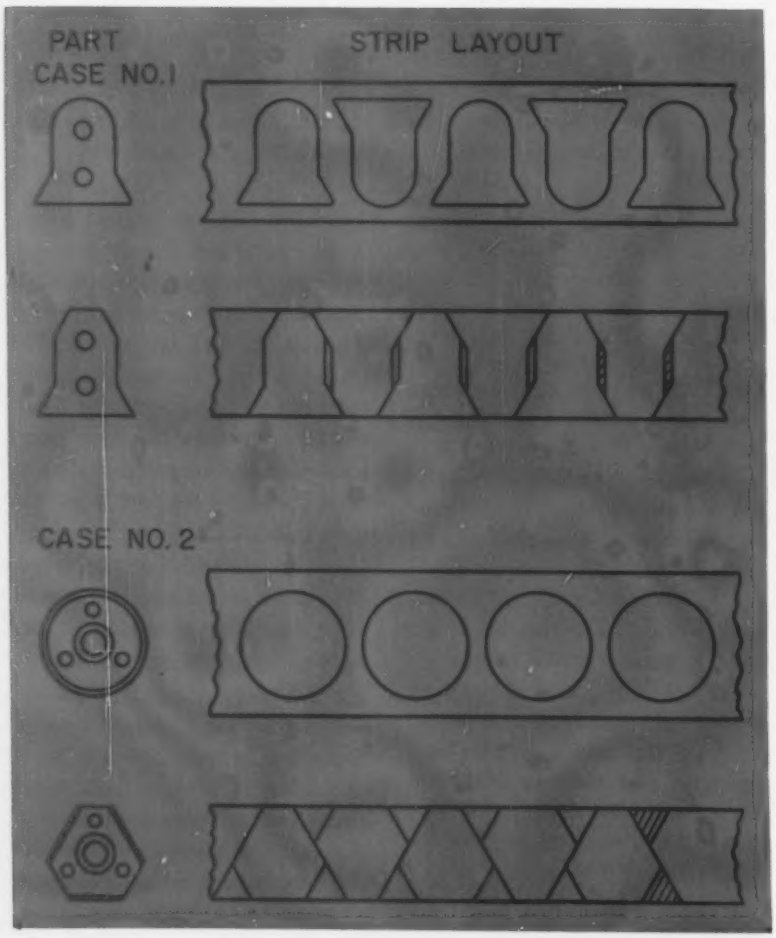
All you have to do is change the contours of the stampings.

■ Through some slight changes in stamping design, you can achieve far greater economical use of sheet stock. If designed properly, these revisions will in no way detract from the proper function of the stamped parts.

Let's start at the beginning with the substitution of "cutting off" in place of blanking. Suppose your present design calls for a rectangularly shaped workpiece that has rounded corners. By making the same corners sharp, you can switch to a simple shearing die. The savings are not only in stock but in tooling as well.

If the sharp corners are objectionable, you can notch them out in an earlier step. The notches can be made by chamfering. This same approach can even be extended to transform round disks into octagons.

Sharp Designs Save on Scrap



From Blanking to Cropping—The first case shows the type of design change needed before a cropping die can replace a blanking die. The change, however, results in a much more economical use of stock.

The production of round disks and washers, while demanding the simplest press tools, has one great drawback. That, of course, is a very poor stock utilization factor. If the function of such stampings can tolerate slight interruptions in their circular shapes, the scrap problem can be solved.

Note the savings in stock in Case No. 2. Here a change was made from blanking to shearing. This particular part is a common spring holder.

Speedier Output — In many of these instances you can also improve the production rate. Use of shearing, for example, produces two stampings at each press stroke. Even though just one blank is stamped, another one is automatically sheared from the strip.

There are many times when the chief details of a stamped part are simply the size and the relative location of the holes punched in them. The shape and the contour of the blanks are immaterial. The same can be said for the relationship between the hole pattern and the blank outline.

That's the very moment when the designer should take over. He has a fine opportunity to create a new shape that is just as functional as the prior design. And he can design a shape that will reap greater savings in stock and tooling.

Scrapless—The bottom drawing shows several examples of possible areas for design changes. Many of these improved strip layouts were so favorable that stampings were produced without any accumulation of scrap at all. They could also be produced efficiently with cheap tools.

Consider the problem illustrated in the top drawing. The task consists of designing a simple workpiece with a base. The base must support three holes in exact positions.

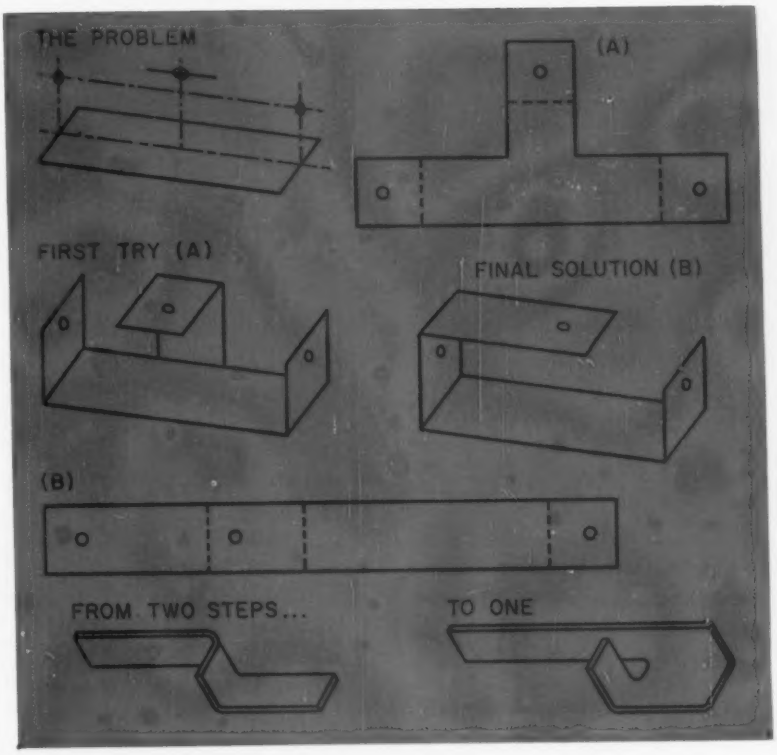
You will note that the first design consists of a flat blank. Unfortunately, the design of this blank entails too much scrap. The final solution makes use of simple shearing techniques. It provides a 100 pct stock utilization factor plus simpler and less costly tooling.

Single-Crack Bending—The other sketch solves a problem of a completely different nature. Stock utilization is not a factor here. In fact, just as much stock is required in the two-step method as in the improved design. The main goal is to find a way to ease and simplify the press operation.

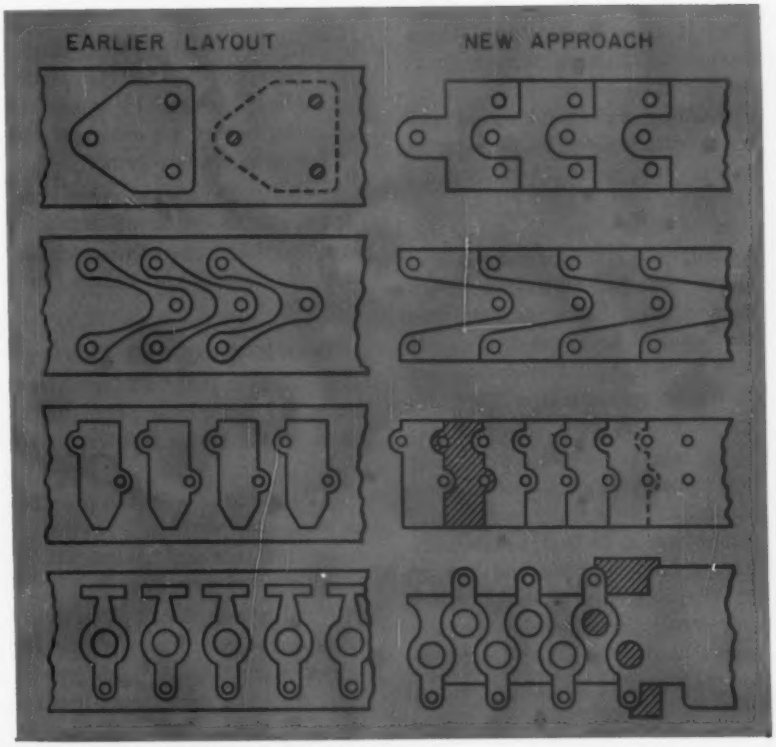
In the previous operation, two separate bends were performed. Each one was done in a separate step, too. By changing the basic design slightly so that both bends can be made in the same direction, the work can be done in a single step with one common tool.

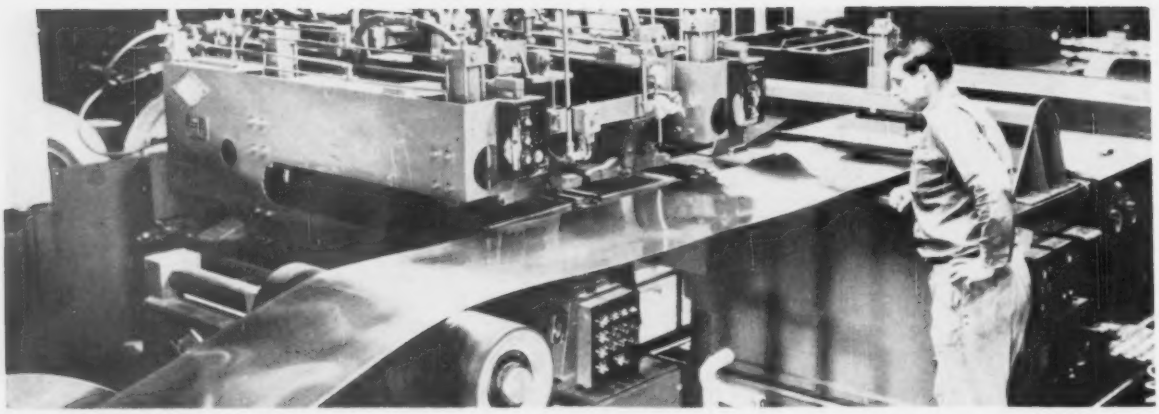
Cost isn't the only factor to consider. Sometimes you'll want to change the design of your stampings to improve the quality of the end product. To get the most mileage out of stamping, the designer must keep several areas in mind. He must cut down on scrap. He must also design for faster output.

Keep Your Eye on Simplicity



Scrapless Layouts Cost Less





JOB'S DONE: After welding strip, the unit hydraulically moves back to prepare for the next splicing cycle.

Seam Welder Joins Strip Quickly

Key to a successful continuous annealing line at Wallingford Steel Co. is a fast moving seam welder.

It moves in automatically joining the stainless steel strip for its trip through the furnace.

■ A resistance welding machine plays a critical part in Wallingford Steel Co.'s., Wallingford, Conn., continuous stainless steel strip annealing system.

Welding and handling of coils must be completed by the time the excess strip in the first looper is exhausted.

If a delay should occur and welding is not completed when the looper bottoms, the furnace would have to be shut off immediately and the entire line stopped. For this reason, Wallingford engineers paid particular attention to welding during the design period.

The machine would have to function quickly and sequence automatically. But equally important, it would have to be highly dependable since a malfunction would be costly. After analyzing its design merits, they chose a resistance welder with several extras deemed preferable for their needs.

Big Unit—The 75 kva machine, rated at 50 pct duty cycle, measures 77 x 100 x 66 in. Its open C-type frame has a throat dimension of 30 in.

Mounted on four V-groove roller bearing wheels, the unit may be retracted from the line after the strip is started through. This is done by a hydraulic cylinder with a 36-in. stroke. Hydraulic power is supplied from a system designed integral with the welding machine.

Two air-operated work clamps, one on each side of the welding wheel and actuated by pushbutton controls, hold the overlapped ends of the strip firmly together.

Initial clamp contact is made perpendicular to the strip's centerline. Any ripples in the strip are ironed out as the clamps deflect under pressure.

How it Works—All control circuitry for the seam welder converges in a push-button panel on the front of the frame below the strip line.

As the end of a coil approaches, an operator presses a button to move the welding equipment forward into the strip line.

Number one looper is activated while the forward part of the line is stationary. The operator jogs the ends of the strips into position through the rollers, closes each clamp by pushbuttons, and energizes the welding circuit.

The wheel electrode begins its forward travel, exerting 1600 lb of weld pressure to splice the overlapped strip. At the end of its forward travel, the wheel contacts a solenoid to raise and return it to its starting position.

The cycle continue as welding clamps release; the feed roller disengages, and the looper ascends, and the strip line starts again. After passing through the furnace and second looper and reaching the recoil reel, the welded section is cut out of the annealed strip with power shears.

Timely Tips—Experience to date is responsible for a few procedural regulations. A 4-in. overlap at the ends of the strip is sufficient. This holds down material waste.

Welding time ranges between 5-10 seconds depending on the gage of the strip. For the benefit of the operator, a meter mounted near the welding area shows the feet of strip remaining in the looper at any instant.

When the remaining footage constitutes one minute of downtime, an alarm bell sounds. To indicate conditions at the top roll, a closed-circuit TV system monitors the strip.

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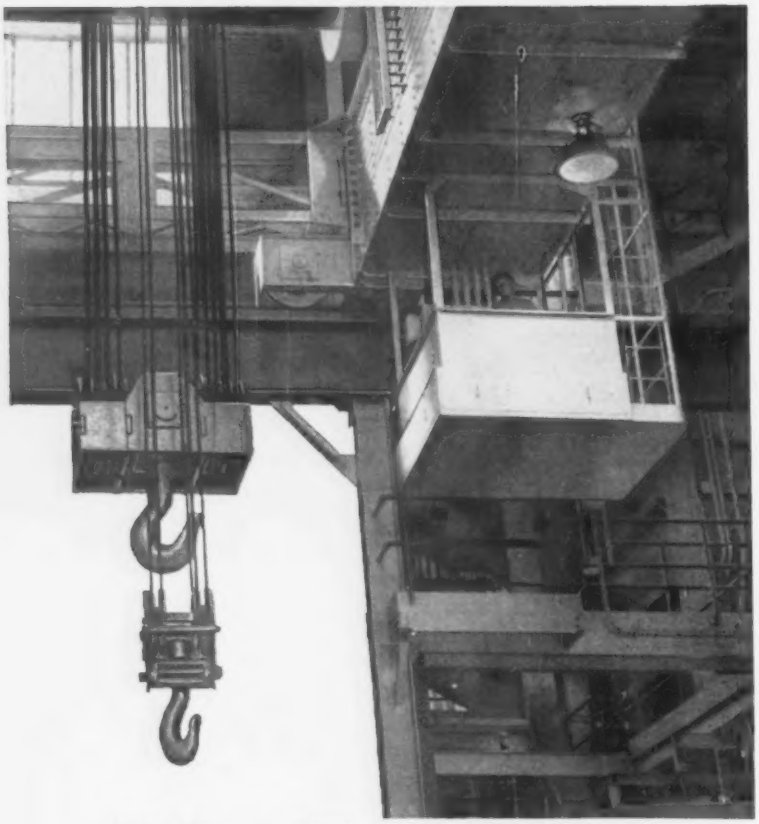
Hot Rolled Sheets	Alloy Sheets and Plates	Electric Weld Line Pipe
Hot Rolled Pickled Sheets		Spiral Welded Pipe

The Shortest Distance Is OVERHEAD



With Shepard Niles JOB-MATED Cranes

Traveling cranes deliver the goods **directly,** from point to point within your plant or warehouse, or even from one building to another.

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NEW PATENTS

Removes Sulfur

Process of desulfurizing pig iron, R. P. Heuer, Apr. 11, 1961. To take the sulfur out of molten pig iron, a fine spray of the melt contacts a high-velocity stream of nitrogen gas. This gas contains a solid desulfurizing agent, preferably powdered burnt lime. It's also protected from contamination by air during its passage from the lance to the bath surface. U. S. 2,979,393.

Steel-Making Method

Method of producing steel from pulverulent iron products rich in carbon, B. M. S. Kalling and F. K. E. Johansson (assigned to Stora Kopparbergs Bergslags AB, Falun, Sweden), Apr. 4, 1961. To produce steel from a high-carbon material such as partially-reduced, iron-ore fines, the material is reduced in a molten pig-iron bath in a rotary furnace and blown with oxygen-rich gases. U. S. 2,978,318.

Aids Cold Drawing

Method for preparing high-grade rimmed steel with wide ferritic peripheral zone, W. Merz (assigned to Niederrheinische Hutte A.G., Duisburg, Germany), Apr. 11, 1961. To prepare a rimmed steel with a wide ferritic border, especially for welding or cold-drawing operations, the melt is saturated with nascent hydrogen, e.g. calcium hydride. This occurs before casting. The hydrogen boils off during the solidification stage. U. S. 2,979,394.

Rustless Iron

Process for the manufacture of rustless iron, S. Katakura and K. Tachiki, Apr. 18, 1961. In the production of rust-resistant iron, the iron powder contacts metallic calcium in an atmosphere of argon or another inert gas. U. S. 2,980,528.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

Special-Steel Die

Now available is an interesting bulletin outlining the development story of a special alloy-steel die. This die eliminates the trouble caused by corrosion effects with some materials. (Sprout, Waldron & Co., Inc.)

For free copy circle No. 1 on postcard

Welding-Control Units

A new data sheet tells about tack welding with dc power from a multiarc system, facilitated by control units designed especially for this purpose. The resistor stations come in portable single-operator models, or 6-drawer units. (J. B. Nottingham & Co., Inc.)

For free copy circle No. 2 on postcard

Abrasive Wheels

Features and applications of a resilient abrasive-cloth wheel, that simplifies sanding and polishing complex-contoured surfaces, are discussed in a new pamphlet. The literature lists available grit grades and describes various shapes. In addition, it covers rotation speeds and abrasive-loading procedures. (Merit Products)

For free copy circle No. 3 on postcard

Electric Motors

All the facts about a line of ac motors are supplied in a new 2-color bulletin. The literature explains the features of every motor to ease the selection of the right motor for each particular task. Accompanying the photos and descriptions of the motors is a round up of the production facilities and procedures used in their manufacture. (Reliance Electric & Engineering Co.)

For free copy circle No. 4 on postcard

Castable Refractories

The physical characteristics of a variety of castable refractories and their applications are spelled out in a newly revised, 24-page booklet. It describes a full range of products for use in furnaces. They're designed to meet the special conditions imposed by furnace operation, atmospheres, fuels and service conditions. (Kaiser Refractories & Chemicals Div., Kaiser Aluminum & Chemical Sales, Inc.)

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Handling Pumps

An improved method of handling epoxy, polyester, urethan and silicones is the subject of a 10-page booklet. It illustrates and gives complete specifications for 20 basic models of a resin-system pump. The units proportion, mix and dispense two- and three-part resin systems in metered shot or steady flow. Also included is an outline of the technical services available from the company. (H. V. Hardman Co., Inc.)

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Holding-Magnet Design

This new engineering bulletin explains an unusual and greatly-simplified method for designing holding magnets and assemblies. Only three factors—required pull, air gap and geometric shape of the proposed magnet— are needed for quick, accurate, design calculations. (Indiana General Corp.)

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Reinforced Plastics

A new state-of-the-art brochure reviews current materials, fabrication techniques and applications of advanced, reinforced plastics. Spe-

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FREE LITERATURE

cial attention is given to high-temperature plastics for space-age applications. (Swedlow Inc.)

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Sling-Chain Catalog

Sling-chain users will find this new literature of interest. It illustrates the various components that make up a complete sling chain. It also shows the few simple steps needed to make the assembly. The chains are available on a quick delivery basis. (American Chain & Cable Co., Inc.)

For free copy circle No. 9 on postcard

Marking Equipment

More than 200 marking tools, fixtures and automated machines are detailed in a new catalog. The 48-page publication lists hand tools ranging from a dozen styles of steel stamps through more than twenty type holders. In addition, it describes many partially- and fully-automated marking machines. (M. E. Cunningham Co.)

For free copy circle No. 10 on postcard

Coil-Carrying Flatcar

A new brochure describes a recently-developed, 90-ton flatcar for coil tin plate. It presents illustrations and specifications. It also tells how the new design eases loading and unloading of the coils. Greater shipment safety and capacity are also claimed. (Thrall Car Mfg. Co.)

For free copy circle No. 11 on postcard

Thermoplastics

Various types, functions and operating features of thermoplastics processing equipment are shown in a 2-color catalog. Each line of equipment is displayed on double-page sections of the new brochure. The machines include extruders, chill roll-casting equipment, blow-molding equipment, monofilament lines, blow-film take-up machines and special equipment. (Modern Plastics Machinery Corp.)

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Special Equipment

Want to simulate control, or monitor transient, static or dynamic conditions in a planned or random sequence to allow the operation or observance of performance characteristics of a product? Here's a booklet that outlines an engineering service that will create special equipment to that job. It also describes eight illustrated types of equipment and outlines their functions and capabilities. (Meriam Instrument Co.)

For free copy circle No. 13 on postcard

Sharpens End Mills

Literature on a new fixture for sharpening end mills and milling cutters is now available. It fully describes the features of an unusual spindle that floats on a film of air. Also included are photos of various setups and accessories, performance charts and applications. (Harig Mfg. Corp.)

For free copy circle No. 14 on postcard

Motor Applications

Describing a line of single-phase, three-phase and direct-current motors, a bulletin stresses matching motor characteristics to specific applications. It also discusses gearmotors and selective-speed drives. (Century Electric Co.)

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Dial Indicators

Two new precision dial indicators, with an accuracy of 0.0005-in. over a 0.015-in. range, have recently been introduced. One is a balanced dial model, the other has a continuous dial. Both have jeweled bearings. Complete information is available in a new bulletin. (The L. S. Starrett Co.)

For free copy circle No. 16 on postcard

Hydraulic Equipment

This new catalog illustrates and describes a complete line of reservoirs, oil-level sight gages and hydraulic power-unit accessories. As a special feature, each reservoir from the 10 gal model through the 250 gallon size is completely dimensioned. (Century Hydraulics, a div. of Century-Detroit)

For free copy circle No. 17 on postcard

Tiny Thermocouples

Micro - miniature thermocouples are described in a new bulletin. The 6-page folder covers the design, construction, applications and operating characteristics of these thermocouples. It also includes drawings and photographs, circuit sketches and graphs. (Baldwin-Lima-Hamilton Corp.)

For free copy circle No. 18 on postcard

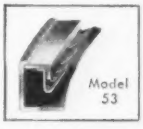
ENGINEERED OIL SEALS for Steel Mills

Garlock KLOZURE* Oil Seals (left) help keep lubrication in, dirt out of roll neck bearing at Inland Steel's East Chicago mill.

Inland Steel applies Garlock KLOZURE Oil Seals for protection of mill roll neck bearings at East Chicago.

Minimizing lubrication leakage from the inboard and outboard ends of the bearings, Garlock KLOZURE Oil Seals provide more constant service as the rolls change position in a lateral movement during operation. Inland finds, too, that in atmospheres of dirt, scale and spray, KLOZURE Oil Seals help keep foreign particles from entering—and damaging—the bearings.

For good, economical bearing protection, Inland joins the growing list of steel producers who use Garlock KLOZURE Oil Seals. Wherever you look in mills, you'll find a specific type of KLOZURE Oil Seals doing a specific job. Model 142, for instance, helps keep water splash and scale out of bearings at the shoulder of mill rolls. Models 64 and 82 protect bearings on back-up and work rolls. Model 53 is recommended for table rolls at normal and high speeds. Model 23 Split KLOZURE is ideal where equipment cannot be dismantled too easily.



Designed for peak efficiency and durability, Garlock KLOZURE Oil Seals resist oil and grease, are impervious to water, mild acids, alkalies, withstand temperatures from −40°F to +250°F. For extreme conditions, Garlock furnishes sealing elements resistant to practically any fluid, and serviceable as high as +500°F.

If you have a particular sealing problem, why not discuss it with your Garlock representative. He's backed by over 70 years of experience in engineering, production and application. Call him at the nearest of the 26 Garlock sales offices and warehouses throughout the U. S. and Canada. Or, write for Catalog AD-181, Garlock Inc., Palmyra, New York.

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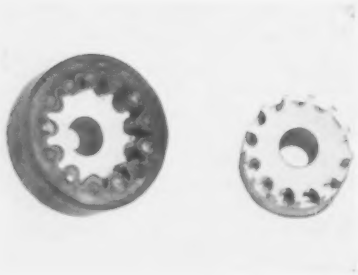
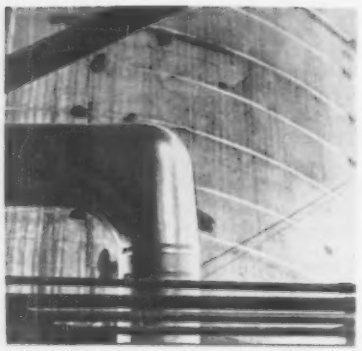
New Materials and Components



Flexible Coupling Compensates for Misalignment

Simple but effective, this shock-absorbing coupling compensates for angular and parallel misalignment. Its Urethane center has a series of metal parts molded in the rubber. These are proportional to distribute the load evenly throughout the flexible center. This results in the coupling's unusual shock-absorbing ability. Since Urethane resists corrosion, long life is another bonus. Add all this to self-lubrication and self-sealing, and you have a very useful assembly. (Olson Industrial Products, Inc.)

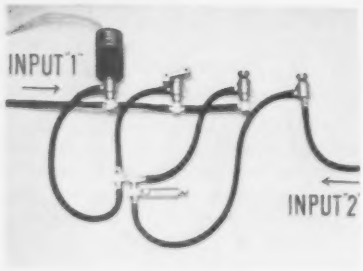
For more data circle No. 21 on postcard, p. 81



Aluminum Jackets Guard Insulated Pipe Elbows

Engineers agree the weakest point of all pipe insulation is the ell joint. Sooner or later, cracks inevitably appear there because of pipe expansion and contraction. And once they start to go, the elements take over and complete the process. Up to now, there was no really-adequate solution. However, a new line of aluminum pipe elbows has some unusual features designed to solve this costly problem. First, and most obvious, is their odd "humped" shape. There are reasons for it. It means you can cover 109 pipe sizes from a selection of only 13 manufactured sizes. This cuts inventories. There's also modern appearance—a far cry from the old stovepipe-black mastic look. (General Aluminum Supply Co.)

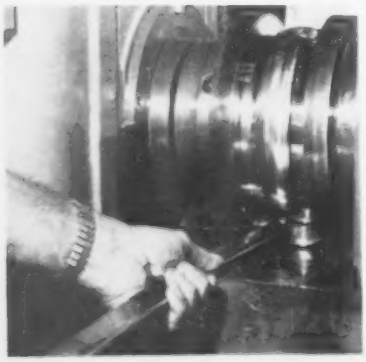
For more data circle No. 22 on postcard, p. 81



Tiny Shuttle Valve Suits Fluid-Power Circuitry

Only ¾-in. overall in size, a new miniature double-check valve fits in with multiple fluid-power circuitry of cylinders, controls and safety devices. The photograph shows the valves joined together to actuate one cylinder, with valves controlled by solenoids, cam followers or manual push buttons, from one pressure source (input "1"), or different pressure sources (input "2"). The units are particularly useful where space and weight savings are necessary. (Clippard Instrument Laboratory, Inc.)

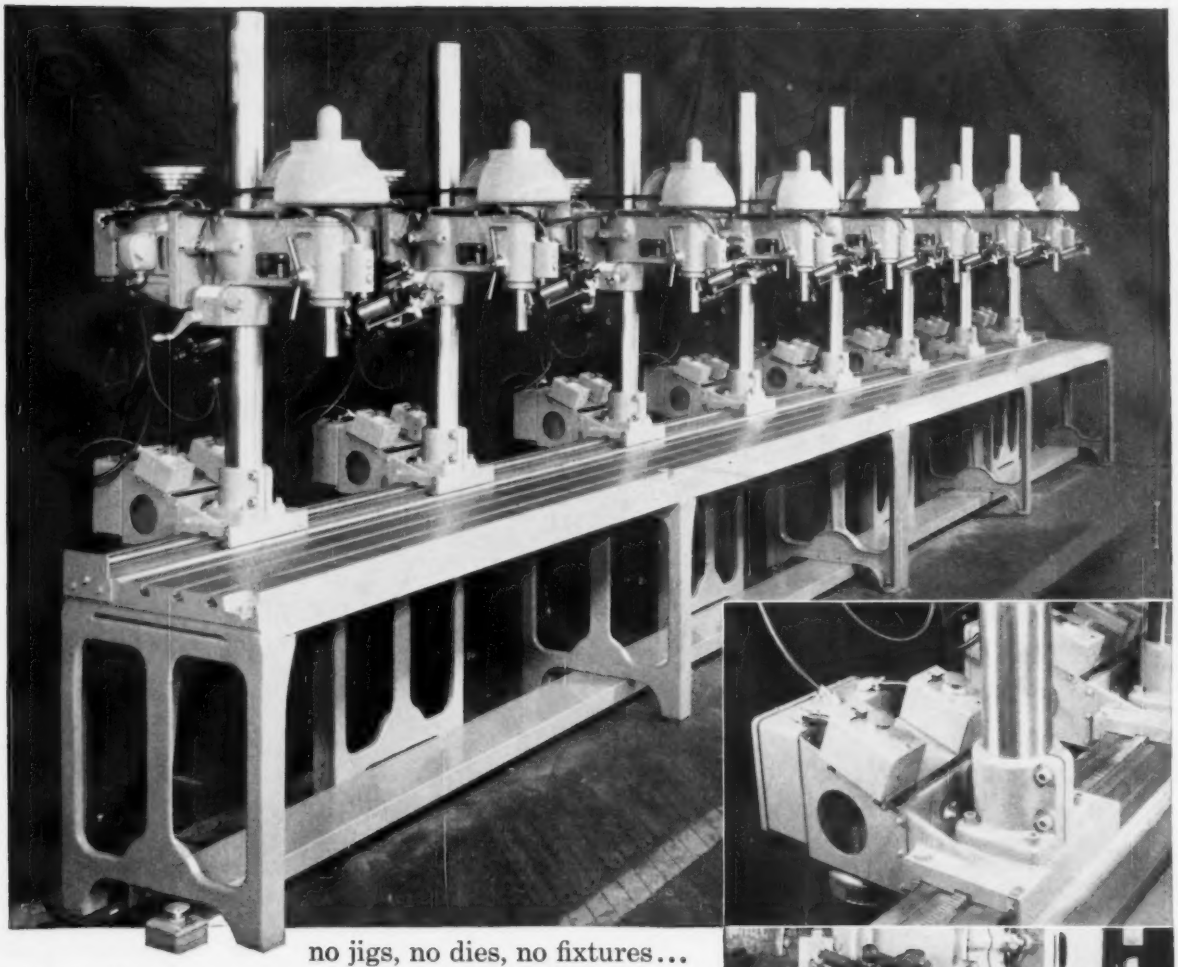
For more data circle No. 23 on postcard, p. 81

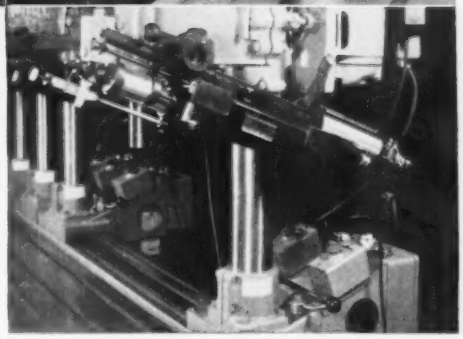


Form-Rolled Titanium Meets Precise Tolerances

Form-rolled titanium is now available in tolerances to 0.001 in. and surface finishes down to eight microinches. It comes in a variety of shapes. One of the advantages of the form-rolling process is it eliminates all or most of the normal machining operations associated with contoured stock. The process turns out blades and vanes for jet engines, steam turbines, nuclear fuel elements and rolled and butt-welded rings. In the photo, a strip of airfoil for jet-engine compressor vanes enters a rolling mill. Such precision-contoured rolling is not limited to titanium. The company processes many other metals with close tolerances, controlled temper and fine finish. (Englehard Industries, Inc.)

For more data circle No. 24 on postcard, p. 81





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29 holes at the touch of a switch!

Production drilling engineered by 'Buffalo'

PROBLEM: Drilling as many as 8 sets of holes in straight sections of aluminum channels to be formed into door and window frames, with varying hole patterns at exact locations to fit hardware and cross members of different size frames.

SOLUTION: A specially engineered 8-spindle 'Buffalo' No. 18 Drilling Machine with air-operated spindles and gear motor-positioned spindles mounted on 28-ft. T-slotted and dovetailed table. Two jogging push buttons on each head move it left or right to nearest $\frac{1}{16}$" by stainless steel scale and indicators. Thus heads may be set up quickly for any pattern with holes as close as $12\frac{1}{4}$". A single foot switch actuates all spindles simultaneously, though any air feeds may be locked out.

CONCLUSION: For fast, accurate, flexible drilling, there's a 'Buffalo' machine quality-built for the job, or 'Buffalo' can engineer one to your exact specifications. Let us know your problem!

TOP: Spindle closeup showing motorized racking device, scale and indicator.

BOTTOM: Showing air-operated spindle feed, rack, slide and clamping device.

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

MACHINE TOOL DIVISION

BUFFALO FORGE COMPANY

Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

'Buffalo' Air Handling Equipment to move, heat, cool, dehumidify and clean air and other gases.

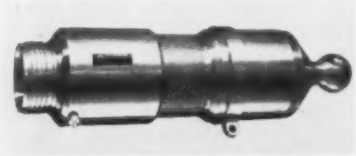
'Buffalo' Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

'Buffalo' Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Squier Machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.

Absorbs Recoil

A special-purpose, liquid-spring shock absorber is the recoil mechanism on 81-mm mortars. When the piece fires, the unit absorbs up to 120,000 in.-lb of energy over a 3-in. stroke. Then its spring force repositions the mortar for fast firing rates. Made of titanium, the spring shock weighs only 25 lb, and adds only three in. to the overall length of the mortar. In fact, the hollow unit is an integral part of the mortar



barrel. The shell passes through the entire length of the shock absorber. The company says this unusual design is typical of the wide-range adaptability that suits their devices to many industrial applications. (Taylor Devices, Inc.)

For more data circle No. 25 on postcard, p. 81

When RPM's get into five figures-

consider Lubri-Case

(-the sulphur case lubrication process that imparts superior bearing qualities to iron & steel)

The high speeds expected from modern mechanisms have caused failure in many non-ferrous components. To take the strain, and to maintain the clearances necessary for adequate lubrication the use of all ferrous parts becomes necessary.

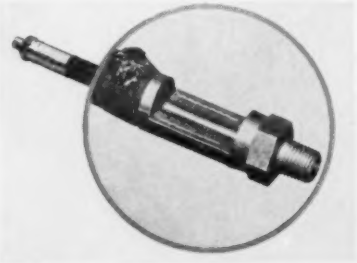
On such parts Lubri-Case, a sulphur case treatment, produces a case high in sulphur on most ferrous materials imparting load bearing, long wearing, lubricating properties even in castable and machineable low cost iron and steel. Lubri-case has been use tested in many applications under high speeds, heavy loads, elevated temperatures and close tolerances.

Drever Company, heat treating specialists since 1939, can Lubri-Case process your "specials" or your production quantities. Write or phone for details.

DREVER COMPANY
• HEAT TREATING DIVISION •
RED LION RD. & PHILMONT AVE. • BETHAYRES, PA. • WIlson 7-3408

Reinforced Hose

Featuring an extremely-high burst strength, this reinforced hydraulic hose suits most industrial uses where insurance against bursting is essential. It withstands a minimum-burst pressure of 50,000 psi. This allows higher operating pressures and frees the hydraulic engineer from some of the limitations placed on equipment design. Here's how the hose is made. Construction starts with an oil-resistant inner tube, covered by an open textile-braid reinforcement. Interply fric-

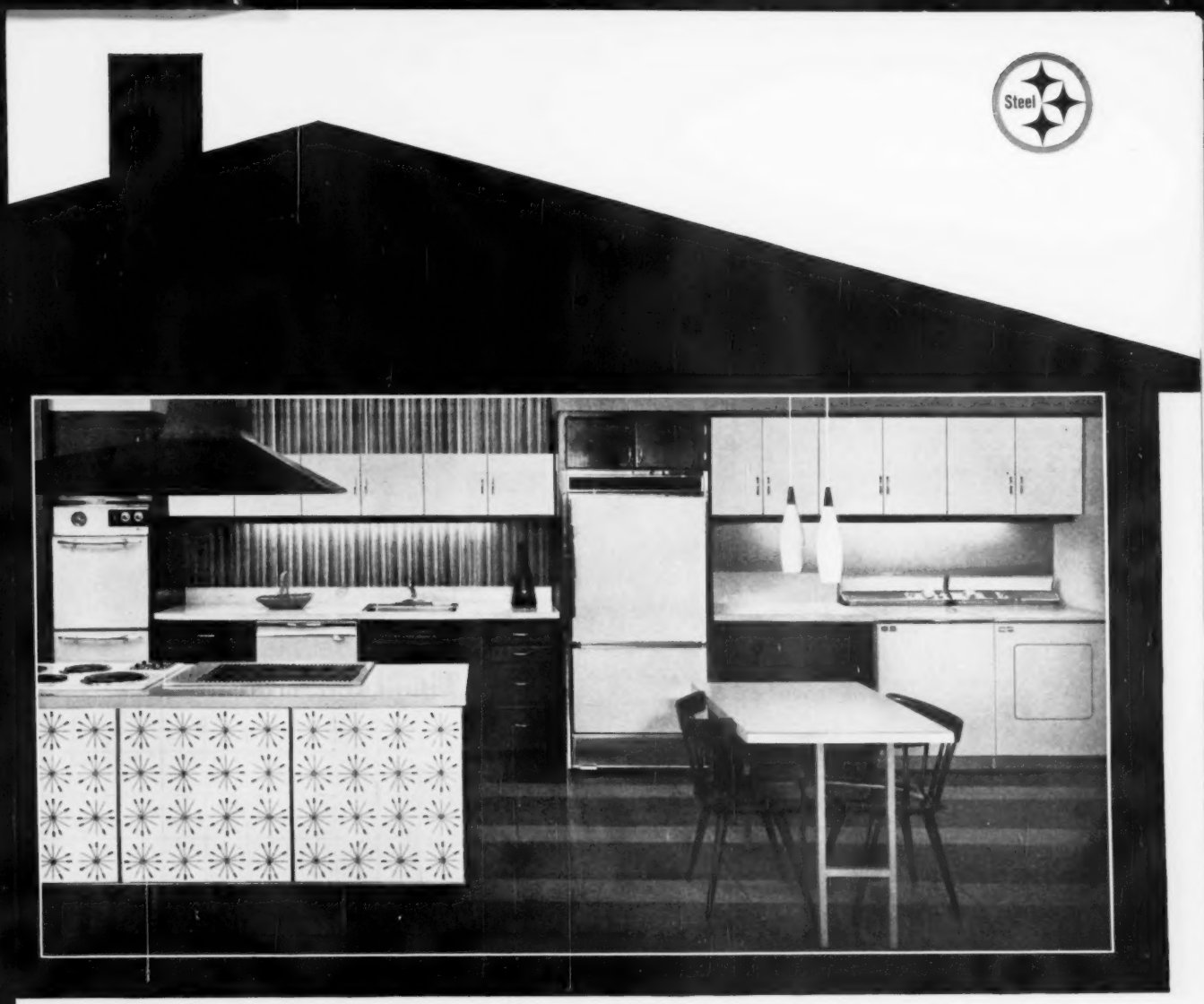


tion layers cover six plies of spirally-wrapped, heavy-wire reinforcement. A tough, synthetic-rubber outer cover resists sun, weather, oil and abrasions. (Anchor Coupling Co., Inc.)

For more data circle No. 26 on postcard, p. 81

Positive Positioning

Taking over the control of machinery and movement of material, this automatic guidance system puts these operations on a steady, uniform, efficient basis, not subject to human error. The basic components of the system are: Programming panel, selector, and route layout or control pattern. What can the system do? Taking over the complete control of a freight-handling operation is an example. Freight-handling tractors, equipped with the control units, automatically follow laid-out routes at a pre-set speed. Thus, the whole operation comes under uniform speed and control. As loads change, the guidance paths can be changed at the flick of



SEE HOW MANY MODERN THINGS THESE STEELS CAN DO FOR YOUR APPLIANCES

When you choose steel for your kitchen appliance line, yours is a product that's all things to all customers—whether they're quality-minded, budget-minded or beauty-minded. In fact, about the only thing that can equal steel's sales appeal is its advantage, economically, to you. Case in point: the modern steels of Weirton Steel Company.

TAKE WEIRKOTE®, FOR INSTANCE—and dispense with the extra costs of anti-corrosion coating operations. Weirkote galvanized steel offers you heavy-duty corrosion resistance, economical flake-free, peel-free fabrication and an advantageously low expansion-contraction rate. The latter gives Weirkote a vital edge over lighter metals—namely, an edge that stays put at the seams, despite the temperature changes that occur in stoves, freezers, refrigerators, washers and dryers. (Weirkote is also available from National Steel's Midwest Steel division.)

OR TAKE WEIRZIN®—an electrolytically zinc-coated steel with excellent corrosion resistance and, when chemically treated, superb paintability. These advantages, plus Weirzin's economical, flawless fabrication, make it an ideal choice for strong, durable, good looking kitchen cabinets.

OR WEIRTON COLD-ROLLED STEEL—to give you a fine, smooth finish and unexcelled ability to withstand the severe forming operations necessary for intricate designs.

OR PRE-PAINTED OR VINYL-COATED WEIRTON STEELS—Factory pre-painting of Weirkote and Weirzin or cold-rolled steel offers you built-in economy, controlled quality and any shade you might want. Vinyl coating, done by National Steel's Enamelstrip Division of Allentown, Pennsylvania, can be ordered in almost any texture and color. Any Weirton Steel goes through all production steps flawlessly and economically.

TAKE MODERN STEEL—particularly in any of the forms mentioned above. For full details, write Weirton Steel Company, Weirton, West Virginia.

WEIRTON STEEL
Weirton, West Virginia

WEIRTON STEEL COMPANY ®

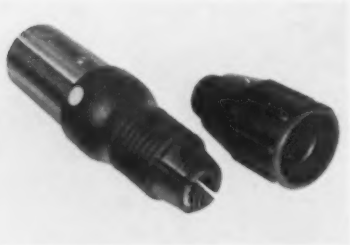
A division of **NATIONAL STEEL CORPORATION**

a switch. Therefore, there's no loss of flexibility. (Barrett Electronics Corp.)

For more data circle No. 27 on postcard, p. 81

Safe Electrical Plug

Design features of a new connector insure maximum safety. It's a 60-amp power plug that needs no special adapters. The entire body is molded of corrosion-proof Neoprene rubber; only the polarizing



shell is metallic to properly engage its mating receptacle. Arcing during disconnects stays within insulated snuffing chambers. Here's another bonus: The flexible grip and tapered sleeve distribute usual bending stresses evenly along the cable. This increases cable life 30 times at the point of attachment. (Joy Mfg. Co., Electrical Products Div.)

For more data circle No. 28 on postcard, p. 81

Resists Corrosion

This photo of the top of a mixing vessel shows a coated agitator that has been in continuous service for over a year in a highly-corrosive mixing operation. The plastic coating also resists abrasion. It's a water suspension of chlorinated polyether that sprays on the base metal. Then it's fused at 400°-500°F. This coating resists most acids and alkalies and many sol-

vents to a temperature of 210°F. Its surface is hard, glossy, nonporous and smooth. (The Pfaudler Co., a Div. of Pfaudler Permutit Inc.)

For more data circle No. 29 on postcard, p. 81

Absorbs Carbon Gas

Extensively field tested in the first quarter of 1961, a new solid absorbant for carbon dioxide comes in three closely-controlled, particle-size ranges. With this formulation, there's no need to pack or mix—simply pour it into the absorption tube. After tapping lightly to settle the particles, the usual glass-wool plug is inserted. Then you're ready to begin an analysis. The formulation comes in dark, purplish-brown granules that change to pinkish-

MILWAUKEE
WROT WASHERS

Away back yonder in the history of our 74-year-old company, long before inventory control became a science, the owners made it a policy to "have what they want when they want it."

Through the years, the Metalworking Industry has depended on *Wrought Washer* . . . the world's largest producer . . . for *Milwaukee Wrot Washers* of an infinite variety of shapes, sizes, types, materials and finishes. Diameters from 1/16 to 23 inches, thicknesses from .005 to 1 inch.

Having more than 129,000 sets of washer dies in our die storages also helps speed your orders. Often the "special" you need is a standard with us — or we can produce it to specifications in short order.

PURCHASING PERSONNEL . . . Free samples available. Request on your letterhead, mentioning types of washers your company uses most frequently. Or write for Washers and Stampings Catalog 40-B.

WW/4/6061/MP

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WORLD'S LARGEST PRODUCER OF WASHERS

white as their absorbant capacity is exhausted. The line of color contrast is sharp. Thus, you know when to replace the absorbant. (Fisher Scientific Co.)

For more data circle No. 30 on postcard, p. 81

Pillow Blocks

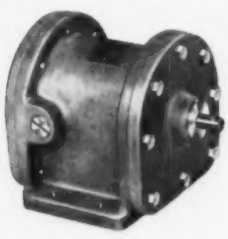
Sturdy, all-purpose, strap-type pillow blocks are now available in

shaft sizes ½ in. through 1 in. The addition of this series to the manufacturer's line increases the range of sizes from ½ in. through 2-3/16 in. for this unit. For ease of installation, a simple detent arrangement holds the 16-gage, cadmium-plated cap and base together until the mounting bolts are installed. The series is available with either a sintered-bronze or a graphite bushing. (Randall Graphite Bearings, Inc.)

For more data circle No. 31 on postcard, p. 81

Explosion-Proof Switch

These new shaft-driven controls suit hazardous locations. Basically,

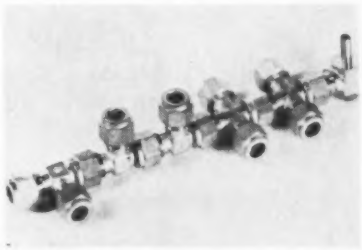


they consist of modified standard units enclosed in a laboratory-tested, explosion-proof housing. Snap-action contacts rate at 10 amp, with 125-v, 250-v, or 460-v ac, ½ amp with 125-v dc, and ¼ amp at 250-v dc. The controls handle driven speeds up to 1900 rpm. Various contact trip-in and drop-out speeds are available. (Winterburn Mfg. Co.)

For more data circle No. 32 on postcard, p. 81

Tees, Elbows, Crosses

Complex manifolds, as shown in photo, can be easily made using these adaptor fittings. Such connections are leakproof, save space and greatly reduce connection time. An added advantage is that tees and elbows can be perfectly aligned in the direction of the intended tubing runs. The fittings come in sizes from ⅛-1 in. in machinable metals



and plastics. (Crawford Fitting Co.)

For more data circle No. 33 on postcard, p. 81

HOBART AC/DC WELDER COMBINATION

***WELD Extra Thin Metals with extremely low current . . . as low as 1 AMPERE!**

Get more convenience features with Hobart's ADI welders for greater versatility and wider welding range. The new AC-DC models feature—

- Welding currents down to 1 AMPERE for welding thin materials
- A new high frequency circuit for easier arc starting
- An automatic high frequency cutout circuit for restarting the arc in the event of an arc outage (High frequency can be operated continuously if desired)
- A new AC circuit for cleaner welds on aluminum
- A choice of AC or DC welding or Inert Gas AC or DC
- A new spot welding timer as an optional feature

—for more complete information write for bulletin ADI

HOBART WELDERS • ELECTRODES

*Models ADI 2641—200 amp. *ADI 3641—300 amp. ADI 5641—500 amp. (welding range 35 to 600)

HOBART BROTHERS CO., Box 1A-61, Troy, Ohio, Ph. FE 21223

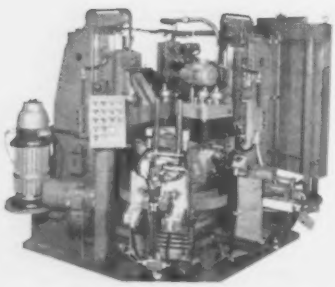
"Manufacturers of the world's most complete line of arc welding equipment"

New Equipment and Machinery

High-Speed Cut-Off Saw Dispenses With Coolant

This new cut-off saw has the versatility for random cutting in fabricating shops or repeat operations in high-volume production. And, it needs no clamping or cooling. The new unit cuts all shapes of carbon and stainless steel, and many of the new alloys as well. To do this, it employs a tooth shape that produces a semi-milling action rather than biting and chipping. The blade moves through the stock so fast that heat is not absorbed. The result is a burr-free cut with no blueing of the metal. Cutting times range from 11 seconds for 12-in #16.5 I-beam, down to 1 second or less on 2 x 2 x ¼-in. angle. (Production Machinery, Inc.)

For more data circle No. 51 on postcard, p. 81



Diamond Tools Machine Sintered-Ferrite Parts

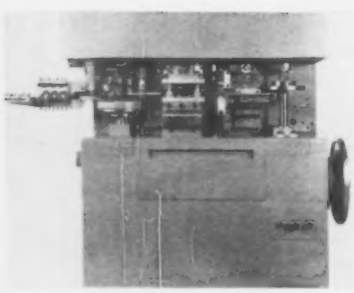
How do you machine a sintered-Ferrite part? It's too hard and brittle for anything but diamonds. The answer is a new machine that handles ferrous drilling, reaming and facing automatically, with diamond cutting tools. These tools are straight-shank types—impregnated with diamonds. In order to use them, special feeds and speeds were developed. The machine itself features a new circular index unit. It fills a long-felt need for an efficient way to machine Ferrite. (Rehnberg-Jacobson Mfg. Co.)

For more data circle No. 52 on postcard, p. 81

Portable Magnetic Device Detects Metal Flaws

Designed for field use, a portable tester detects cracks and flaws in ferrous metals. Essentially, it's a powerful U-shaped, 2-pole electromagnet that weighs only 14 lb. For ready use in most locations it can be energized by a 6- or 12-v automobile storage battery, or by a 110-v service outlet. Here's how it makes the test. The detector is placed so that the two poles bridge the area to be examined. When the power is switched on, lines of nonreversing magnetic flux flow through the specimen. To make the flux pattern visible, ferromagnetic powder coats the area in question. These particles align so that they duplicate magnetic distortions caused by cracks in the metal specimen. Thus, they tell the type and extent of the flaw or discontinuity. (Westinghouse Electric Corp.)

For more data circle No. 53 on postcard, p. 81



Smaller Machine Forms Wire and Strip Components

A smaller version of two vertical four-slide machines, this newcomer retains their versatility. Thus, it adapts to add welding, tapping, swaging, thread rolling and other secondary operations to the primary strip-forming cycle. But, principally, it's designed for high-speed production of small-wire and strip components with an unusually short setup time. Production rates are from 100-500 strokes per minute with standard-rise cams—100-350 strokes per minute with maximum-rise cams. (Torrington Mfg. Co.)

For more data circle No. 54 on postcard, p. 81

SPECIAL REPORT

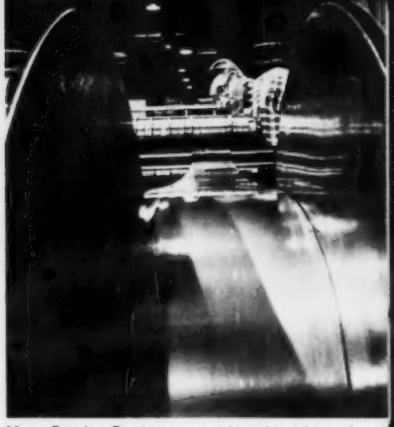
from United States Steel

HOW TO FEED A GIANT

turn page for the story

Steel is stocked for fast delivery . . . day and night.

This multiple-head flame cutting operation saves customer investments in equipment.



Many Service Centers are equipped to trim and slit coils of steel sheet.

STEEL SERVICE CENTER INSTITUTE

Look what the "iron room" started

The call came at 7:00 P.M., halfway through the Steel Service Center Manager's dessert course. The voice on the other end belonged to a local steel fabricator, and there was an edge of panic in it. A mill shipment of steel had been stalled on the road by a storm. He had 38 men on his production line turning out a critical defense order, and he was running out of steel. He needed 5,000# of cut-to-size hot rolled steel sheets by midnight to keep the line running. The manager hung up and immediately dialed his stock supervisor, who was sure they had the right thickness in stock. Fortunately, it was company bowling night and the stock man, shear operator, crane operator and a truck driver were all in one place. The manager drove by the bowling alley, picked them up and they were off to work. By 11:00 P.M. the sheared-to-size sheets were loaded on the truck. By 11:45 they were on the fabricator's production line.

This scene could have happened in any one of hundreds of what are called Steel Service Centers. A scant fifty years ago, when the steel industry itself was in its infancy, they were known as "iron rooms." There were just a couple hundred in the entire country and they were usually located to the rear of a hardware store or harness shop. It was where you went if you needed any of the few iron shapes that were available in that bygone era. If you could pluck an iron room proprietor out of the past and introduce him to a modern Steel Service Center, he would not believe his eyes.

Most awesome of all, he would see incredible stocks of *thousands* of steel items: plates, sheets, bars, structurals, strip and dozens of other steel products in a nearly endless range of sizes and chemical analyses. He would see complex equipment handling the steel as if it were feather light. He would see more equipment than he ever saw in a factory of his day. And he would be totally mystified by the computers and accounting systems that keep track of it all.

In short, he would see one of modern business's most efficient distribution systems, a vast network of 1400 Steel Service Centers who take over where mill shipments of steel leave off. Nearly a half a million small steel users buy *all* their steel from Steel Service Centers, and every manufacturer buys at least part of his steel from them. A *fifth* of all the steel produced in the U.S.A. passes through Steel Service Centers and other types of steel distributors. Here's why:

Profile of a giant. To understand what a Steel Service Center is and why its role is increasingly vital to the health of modern manufacturing, you have only to look at the personality of their market, the metalworking "giant." It is made up of thousands of steel fabricating firms who will consume millions of tons of steel this year. About 80% of that steel will be shipped in full carload and truckload quantities directly from steel mills to fabricator customers. Thousands of small steel users couldn't stay in business if Steel Service Centers weren't on the scene to distribute the remaining 20%, and to provide the remarkable services they do today. And thousands of large steel users need Steel Service Centers to maintain efficiency.

The production line is the lifeblood of the metalworking giant. It chews up mill shipments of steel by the carload, and it works only as long as it is being fed. But gaps between mill shipments are inevitable, and that's where the Steel Service Center steps in with immediate delivery of the exact type, size, and quantity of steel needed to keep the line operating.

The problem of the small steel user is just as critical. He requires smaller quantities and frequent, quick deliveries, so he buys where quick deliveries of small quantities are usual business practice—from a Steel Service Center.

Large or small operation, efficiency is the key to survival for a steel fabricator, and here the Steel Service Center plays an increasingly important role. Often the fabricator can't afford to invest in specialized equipment because it would stand idle much of the time, so the Steel Service Center invests in the equipment. Service Centers have equipment that does much of the preliminary work on steel, such as cutting to size, so it can go straight on the production line, and it is done with more efficiency because Service Centers can operate the equipment at higher capacity.

In this day of spiraling wages and costs, Steel Service Centers are showing steel users that often it is cheaper for the users *not* to stock large quantities of steel. They point to costs tied up in inventory space, extra handling, manpower, scrap loss, insurance and taxes. Their message: let us stock your steel for you.

Business can be a circus. Because they're in business to deliver steel when and where it's needed, Steel Service Centers have problems that would leave some logistics experts bug-eyed. A Center in Michigan, for example, has a man-sized IBM computer that hums furiously most of the day keeping track of the more than 20,000 steel items in stock, and trying to outguess the next week's market. Some Centers stock a complete range of steel products, others tailor their stocks to a specialized local market—sometimes to a single industry. But there's hardly any way of knowing what might happen next. The *average* order handled by a large Steel Service Center in Missouri, for example, weighs 1,300# and sells for under $200, but it takes all kinds. One week in March, the Center's biggest order was a whopping 200,000# of mixed small quantities of hot rolled bars, structurals and sheets. That same week, a harried engineer from an airline's

Service Center metallurgist checks contour-sawed parts for dimensional accuracy and hardness.

Metallurgy is an important factor in Steel Service Center operations.

This mark tells you a product is made of modern, dependable Steel. Look for it on the products you buy.

maintenance shop rushed over in a taxi, left the meter running and paid cash on the barrelhead for a single sheet of hot rolled steel. They still talk about the day the circus came to town and the human cannon broke down. The human cannonball himself hightailed it to the Center for a scant 4 inches of $1\frac{1}{2}$-inch tubing so that the show could go on.

Emergency is commonplace. To the harried production line superintendent caught with his inventory down, to the steel user who buys steel only in small quantities, to the custom fabricator who has no way of knowing what his steel needs will be next week, the show *must* go on and Steel Service Centers see that it does. Last month, a Massachusetts Service Center found they had exactly 16 hours to locate, cut and deliver 180 pieces of 4150 annealed alloy steel $3\frac{1}{2}$" rounds in lengths from $\frac{5}{16}$" to $2\frac{11}{16}$". They got the message late at night and the cut-to-size rounds had to be on a local machine shop operator's lathes by noon the next day to meet an emergency delivery of critical aircraft engine parts. They did not have a pound of the required sizes in stock, but they got on the phones and located everything they needed in a branch Center 40 miles away. After a fast truck trip and a pre-dawn call to the cutting machine operators, the sized steel rounds began to flow into the machine shop and were on the operator's lathes before noon.

They were just beginning to breathe easily when a local housewife wandered in, presented a "grocery" list of steel bars and rods that her do-it-yourselfer husband needed. *Her* emergency, she explained, was that her husband would be furious with her if he didn't have the steel to work on that evening. Although she should have done her shopping in a hardware store, she got her steel and she got it with a smile because the Center believes in Service.

Who says service has disappeared? Millions of American shoppers complain that "service" of years past has vanished. But you don't hear that complaint about Steel Service Centers; here, service has never been better. Service Centers not only do the "impossible" in getting steel where it's needed when it's needed, but they're making sure a full spectrum of fringe services are available, too. Because there are over 10,000 different steels available today, Service Centers make available to their customers extensive metallurgical service so that those customers can be sure the right steel has been selected for the job. And Service Centers are helping their customers with fabricating problems, often suggest cost-cutting design changes, and are providing more efficient ways to deliver steel to customers with more of the preliminary operations already completed. They're endlessly tinkering with new ways to provide service through use of electronic computers and improved handling equipment, like forklifts that *hang* from overhead traveling cranes, that will get steel on its way even faster.

One New Jersey Center developed a method of cutting irregular shapes from heavy stainless steel plate that amazed the experts and pulled inquiries from many design engineers.

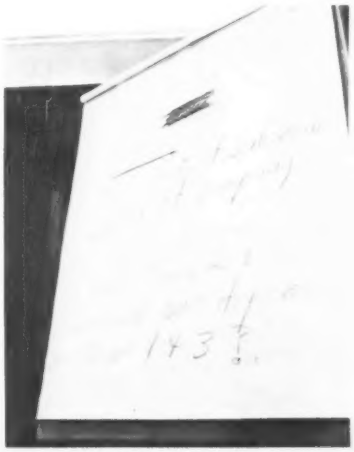
Our stake. It all leads us to say that we at United States Steel—producers of the widest range of carbon, high strength, alloy and stainless steel quality products in the industry—are proud of our association with the descendant of the iron room: the Steel Service Center. For years we have demonstrated our interest by actively helping them sell. USS has furnished metallurgical and technical information and assistance to Steel Service Centers for their use in selling steel to *their* customers, and we have traditionally promoted warehouse markets by stimulating greater use of steel. Why? Because of another fact we're proud of: of all the steel sold through Steel Service Centers, more of it is made by United States Steel than by any other producer.

USS United States Steel

TRADEMARK

This stainless steel gear blank was cut by a unique process developed by a Service Center.

It takes computers to keep pace with today's demands on steel distribution.



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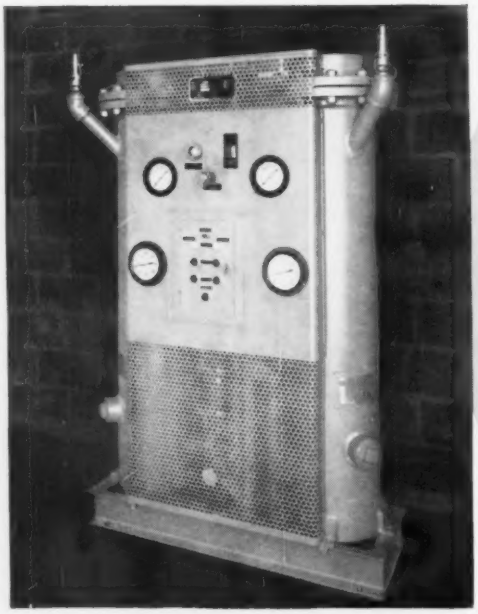
For precise atmosphere control in metalworking . . .

KEMP ORIAD DESICCANT DRYERS

give you 3 big advantages!

- In drying compressed air for air tools
- Drying hydrogen, helium, nitrogen
- Purifying furnace gases
- Drying instrument air
- Metal treating and brazing
- Drying air for paint sprays
- Testing equipment



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Thermostatic control conserves heat input . . . keeps ideal temperatures for the highest operating efficiency at the lowest operating costs. The entire network is protected by an alarm circuit.

3 Complete automatic operation

Once the program timer is set, everything is regulated automatically. Drying takes place with the least loss in pressure, the lowest cost in maintenance and operation. For further information, write for Bulletin D-103 . . . or call the man from Kemp listed in the Chemical Engineering Catalog.

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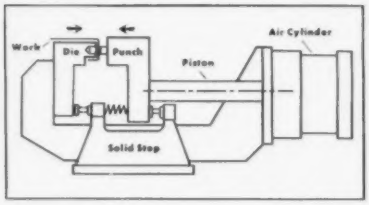
"One-Two" Punch

An automatic piercing machine adapts the pneumatic - equalizing principle used on resistance-welding guns. In operation, the method resembles the old one-two combina-

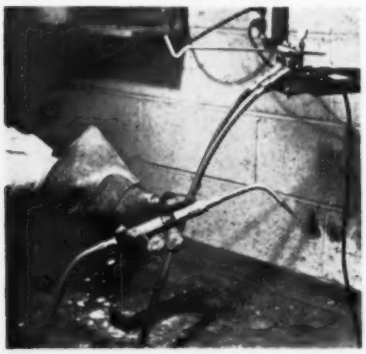


tion used in the prize ring. Let's see how it works. The die holder (see illustration) bolts to one end of a "C" frame, and mounts on an air cylinder at the other end. The punch holder is keyed to guide rods and carried on the cylinder piston rod. When air pressure is applied, the cylinder moves back, carrying the die holder with it into position against the work. With the holder movement arrested by a solid stop, the action reverses. The piston moves forward, carrying the punch into the die to complete the piercing function. (National Electric Welding Machines Co.)

For more data circle No. 55 on postcard, p. 81

Valveless Torch

A new, valveless, welding torch suits production welding and brazing operations. It's different, in that



needle valves have been eliminated from the torch assembly. Regulators on the gas cylinder or pipeline station adjust the flame. But, a gas metering device located between the gas supply and the torch, closes off

Hydraulic Punches

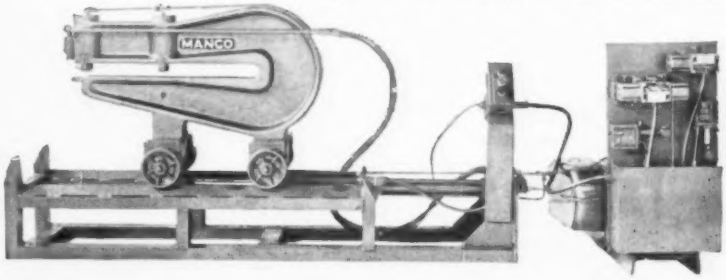
FOR METALLURGICAL TEST SAMPLES
PRODUCTION APPLICATIONS

Manco offers a wide variety of high pressure hydraulic punches for obtaining metallurgical test samples and for production punching applications. Typical is the metallurgical test sampling unit shown above. It punches a burr-free undistorted, 4" diameter sample from .070 mild steel in 2 seconds cycle time. Units can be roller mounted where required. Punches for bench mounting in laboratory also available.

WELD IDENTIFICATION PUNCH

This Manco traverse mounted punch is used to punch "warning holes" adjacent to welds in steel strip. Two burr-free 3/16" holes are punched simultaneously through .150 sheet steel on 12" centers. Punching cycle is 1 second. The wheeled traverse and punch operation is actuated by a single push-button. Complete cycle, 6 seconds.

Write for Complete Information and Catalog



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ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

NEW EQUIPMENT

the fuel mixture whenever the torch is hung on its hook. When you pick up the torch, the gas flow starts again. Less gas consumption and reduced operator fatigue are benefits claimed for this system. (Air Reduction Sales Co.)

For more data circle No. 56 on postcard, p. 81

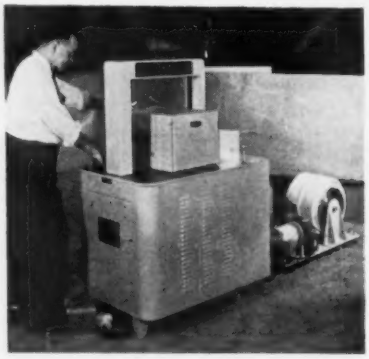
Atmosphere Furnaces

Featuring heating elements made of molybdenum disilicate, a complete line of furnaces come in three models: Cabinet, elevator and shuttle-kiln. The line is particularly suited to two types of operating conditions. One is firing in oxidizing or nitrogen atmospheres in the temperature range from 2600°-3000°F. The other is firing in atmospheres containing carbon monoxide or hydrogen at temperatures up to 2730°F. Hearths, raised above the floor, expose the complete load to radiation. (Harrop Precision Furnace Co.)

For more data circle No. 57 on postcard, p. 81

Strapping Machine

An automatic strapping machine does the job using a high-strength rayon strapping material. The two models represent the first truly automatic machines that handle this rayon strap. The smaller model straps packages in a range of 6 x 6 in. to a maximum size of 20 x 20 in. Length doesn't matter and no machine adjustment is necessary. The larger model straps package sizes between 15 x 15 and 36 x 36 in., with similar automatic features. Both are powered by ½ hp, single-phase electric motors with 1200 rpm. The dispensers use similar motors with 1700 rpm. Both the automatic machines have five air cylinders requiring a 1-cfm air supply. (Industrial Packaging Dept., American Viscose Corp.)



For more data circle No. 58 on postcard, p. 81

Finishes Heavy Parts

For finishing large and heavy workpieces, a new wet-blast unit features an unusual work-handling device. Bolts secure this attachment to the blast cabinet. It serves not only as a loading area for the

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NEW ISSUE May 19, 1961

$15,000,000

Allegheny Ludlum Steel Corporation

4¾% Sinking Fund Debentures Due 1986

Dated June 1, 1961 Due June 1, 1986

Price 99.50% and accrued interest

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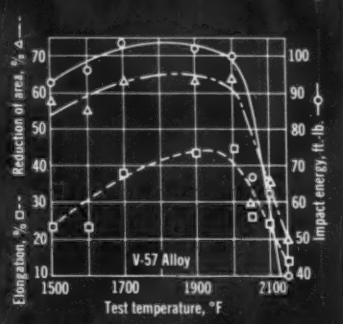
Hornblower & Weeks — Dean Witter & Co. — Bache & Co.

Dominick & Dominick — Drexel & Co. — Hemphill, Noyes & Co.



Plot of tensile-impact properties indicates that the recommended hot working range of Carpenter's V-57 alloy in wrought form lies between 1700 and 2000°F.

fast, new test pinpoints best forging range for high temperature alloys

A fast, easy and economical, new Carpenter test takes much of the guesswork out of hot working high temperature alloys. The results, when correlated with other Carpenter test data and mill experience, reveal the best working temperatures—help forge shops get better finishes with less machine clean-up . . . less wasted steel . . . fewer rejects . . . faster fabricating.

Based on tensile-impact . . . Using a modified tensile-impact test method, impact strength, elongation and reduction of area in an alloy are determined over a range of temperatures. By plotting tensile-impact properties as a function of temperature, the hot working range of the alloy can quickly be established. (see chart)

New, improved Carpenter techniques and quality controls like this, are your best assurance of easy forgeability and consistent uniformity in high temperature alloys. For details, or data on Carpenter's VACUMELTROL® and CONSUMET® vacuum melted products, call your Carpenter representative today.

Carpenter steel

you can do it ***consistently*** better with Carpenter Specialty Steels for specialists

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Export Dept., Port Washington, N.Y.—"CARSTEELCO"
Alloy Tube Division, Union, N.J.
Webb Wire Division, New Brunswick, N.J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.

TIN
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from .00002
to .0025
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THIN STRIP
For the first time tin coated thin strip is available in solderable coatings up to .0025" thick.
Pure tin and tin-lead alloys are now coated on copper, brass, or nickel in all gauges from .002 to .012 in thicknesses of .00002 to .0025.
Over 50 years experience in the highly specialized field of thin strip makes Somers your #1 source for that one job in ten that must meet rigid specifications. Write for confidential data blank to get the exact thin strip for your requirements — no obligation, of course.
SOMERS BRASS COMPANY, INC. • 94 Baldwin Ave., Waterbury, Conn.

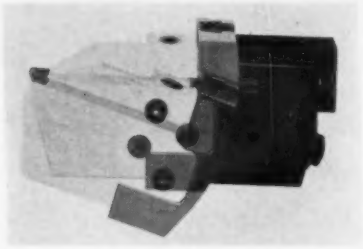
work, but also as a rinse area. For this purpose, a stainless-steel rinse tank and wash curtains are fur-

nished. All you need for immediate operation is a 110-v connection, a ½-in. water connection and a ¾-in. compressed-air connection. The unit processes heavy plastic molds, glass molds, casting dies, forging dies, and the like. (Pressure Blast Mfg. Co.)

For more data circle No. 59 on postcard, p. 81

Rake-Angle Tool

Here's an innovation in cut-off tools. It's a rake-angle tool that sets on zero rake or any positive rake up to 16°. Two locking screws and a bevelled circular T-slot hold the rake-position angle. Since rake angles vary depending on the type of metal to be cut off, this new unit



should be a most useful addition to any shop. To make it even more useful, rake angles can be set without removing the tool from the machine and without losing center location. (Portage Double Quick, Inc.)

For more data circle No. 60 on postcard, p. 81

Heats Small Slugs

This compact production furnace heats small brass slugs for forging. As the slugs heat up, a mesh belt

carries them out the discharge end. From there, they're on their way to the forging press. Supported by four legs, the furnace fits in most existing shop spaces. It's set up for

3-phase, 440-v, 60-cycle operation, and draws about 50 kw. Since the heating is essentially simple, no atmosphere is provided. (The Waltz Furnace Co.)

For more data circle No. 61 on postcard, p. 81

Pressure Die Cutting

To produce rubber items from sheet stock, many advantages are inherent in a die-cutting method that presses instead of punching the dies through the stock. For instance, the pressing action prevents the dies from jumping, and the material from creeping or buckling. This means perfect cuts every time and less wasted material. A new machine develops the pressing action hydraulically. It puts enough pressure on an ordinary steel-rule-and-plywood die to push it smoothly through the toughest material. (United Shoe Machinery Corp.)

For more data circle No. 62 on postcard, p. 81

Protect the Hands

Handling hot shell cores and molds is much safer and more comfortable with these new extra-heavy gloves. They're made from a recently-developed fabric that contains thousands of air cells. The gloves come in gauntlet or safety-cuff styles. For very high mold temperatures, there's a fleece-lined insert. (The National Acme Co.)

For more data circle No. 63 on postcard, p. 81

Welding Helmet

There are no bolts, screws or nuts in the headgear-to-helmet assembly of a new welding helmet. Five, fast and easy adjustments fit

it to any head or position. For more comfort, the headgear has a pressure-sensitive foam sweatband. Fixed-front and lift-front frames are readily interchangeable between straight and curved fiberglass shells. (Welsh Mfg. Co.)

For more data circle No. 64 on postcard, p. 81

C ELECTRIC FURNACE STEEL CASTINGS

are engineered to *YOUR* specific requirements

"C" steel castings are CLEAN steel castings of uniform structure that will minimize machining and assembly costs, permit of greater freedom and efficiency of design and add to your product the recognized strength, endurance and desirability of steel. C steel castings, foundry engineered from pattern to finished casting can be had in

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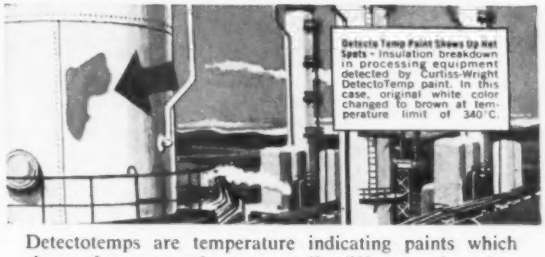
Color-Changing Paint Indicates Temperatures — Thermal Distribution


Detecto Temp Paint Shows Up Hot Spots - Insulation breakdown in processing equipment detected by Curtiss-Wright DetectoTemp paint. In this case, original white color changed to brown at temperature limit of 340°C.

Detectotemps are temperature indicating paints which change from one color to a totally different color when certain temperatures are reached. They are used in hundreds of operations from chemical processing, petroleum refining to welding, forging, heat treating and monitoring surface temperatures to improve quality, reduce costs or increase safety. Detecto Temp has the unique ability to indicate local temperature variations. This is impossible to do with thermocouples or any other presently available product. Colorful folder available.

DETECTO TEMP
Paint available in 4 oz. and 1 lb. metal cans. 36 types cover temperature range from 40°C to 1350°C

Thermochrom
Crayons convenient for testing surface temperatures of small areas. 18 crayons cover temperature range from 65°C to 670°C.

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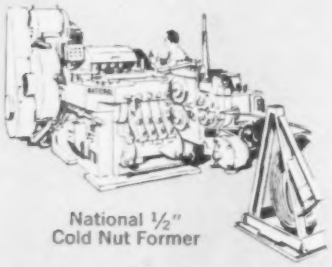
These unusual nut blanks are formed *automatically* — on compact, efficient National Cold Nut Formers.

Quality is excellent, scrap is low and remarkable savings are realized over other methods.

Send us your "Tough Nut Projects." Better yet, come to Tiffin where we can concentrate on *your* nut production. No obligation.



National ½" Cold Nut Former

(Available in sizes ¼" through 1")

NATIONAL MACHINERY CO.

TIFFIN, OHIO, U.S.A.

HARTFORD DETROIT CHICAGO

NEW BOOKS

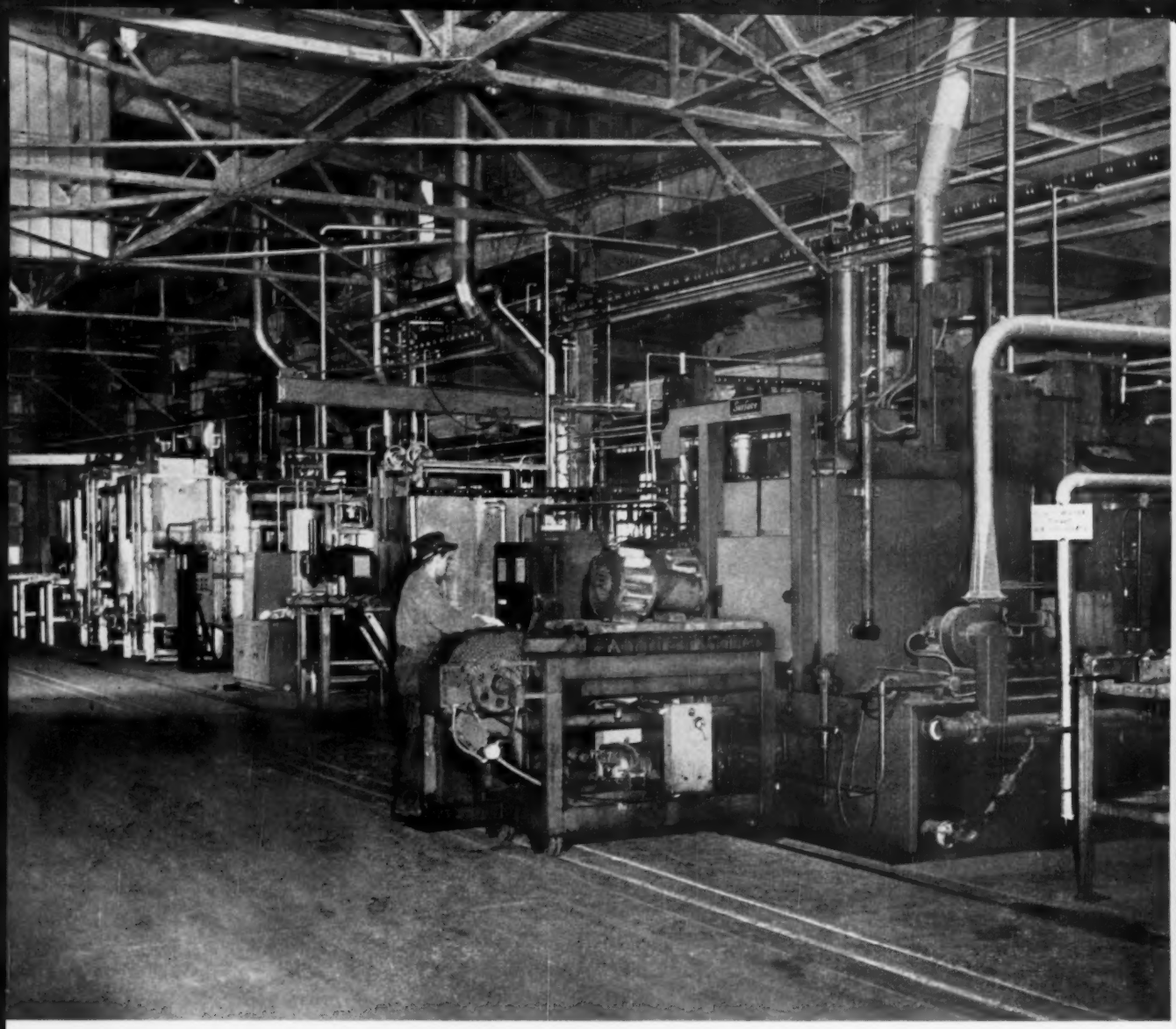
"Ultrasonics and Its Industrial Applications," by O. I. Babikov, is translated from Russian. Although the volume covers recent Soviet advances in this field, its scope is universal. It will serve as an aid to all technicians and scientists interested in the industrial applications of ultrasound. The author discusses ultrasonic control methods, the action of high-intensity ultrasonic oscillations on various technological processes, and ultrasonic drilling techniques. There's also information on ultrasonic-pulse methods of flaw detection and physiochemical research. In addition, the fundamental physical principles are presented in concise form. 230 pp. $9.75. Consultants Bureau Enterprizes, Inc., 227 West 17th St., New York 11, N. Y.

"Mine Ventilation and Air Conditioning," by Howard L. Hartman, concerns itself with modern theory and practice in mine ventilation. Professor Hartman heads the Department of Mining at The Pennsylvania State University. In the book, he approaches the subject from the concept of the total mine atmospheric environment and its control. All the fundamental theory is given, in a readable text. But, this theory must be used. Thus, most of the volume deals with practical control systems, evaluated in terms of units that are now in operation. However, other less tangible factors affect engineering design, and these are not ignored. For instance, the effects of physiology, mining economics and law enter the picture. Also included is practical information on equipment and systems evaluation. 398 pp. $12.00. The Ronald Press Co., 15 East 26th St., New York 10, N. Y.

Compressed Air and Gas Handbook, 3rd Edition, will be of interest to all those whose profession involves applications of air and gas. Written by engineers, specialists from industry, it is a comprehensive single source of air and gas information. Data is presented as simply as possible. Whenever possible, tables and charts summarize the information and facilitate its use. Also, the text has been carefully indexed and cross referenced to make it even more useful. This means you can pick it up and locate the information you need in a hurry. 592 pp. $8.00. Compressed Air and Gas Institute, 12th Floor, 55 Public Square, Cleveland 13, Ohio.

"High-Strength Steels for the Missile Industry," edited by H. T. Sumsion, is comprised of papers presented at the symposium on the same subject during the Golden Gate Metals Conference, 1960, in San Francisco. The book stresses problems in the development and application of ultra-high-strength metals for America's missile program. Fourteen outstanding authors, actively working with materials for aerospace requirements, are represented. 276 pp. $12.00. American Society for Metals, Metals Park (Novelty), Ohio.

"A Guide to Personal Success in Management," by Fred DeArmond, points the way toward executive achievement and advancement. To achieve a goal you must first define it. And here lies much of the guide's merit. It will assist the young executive in clarifying his aims. But even with the destination established, the route to management success needs a roadmap. This book can show the way. It uncovers the basic skills the young executive must have. And, it offers a practical, constructive program to hone these talents into effective management tools. This program indicates the lines along which on-the-job education can be profitably continued. Perhaps most valuable of all, the second half of the book presents examples of actual managerial problems. It poses these problems in a series of "What Would You Have Done" quizzes that enable the reader to test his managerial skill. This self-evaluation gives the reader a step-by-step check on his developing skills. 220 pp. $4.95. Prentice-Hall, Inc., Englewood Cliffs, N. J.



Batch type furnaces form mechanized heat treat line

At The Harnischfeger Corporation, one man can supervise a group of standard heat treat units linked with a shuttle buggy which moves parts quickly and easily from process to process.

Production rate is 460 net pounds per hour of pinions, gears, rollers, shafts, and pins. Chief reason for this is the Surface atmosphere Allcase® furnace. No matter how dense the load, this Power Convection furnace automatically hardens and delivers parts with uniform quality.

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When you specify Revere for electric welded steel tubing, you are tapping more than 40 years' experience meeting requirements for every type of application. What's more you get these advantages:

Wide selection of shapes—squares, rounds, rectangles, etc. in either mechanical or pressure tubing.

Speedy delivery—continuing set-ups of popular sizes from ¼" to 5" OD and proportionate sizes in squares, rectangles, special shapes. (*Ask to be put on our Advance Production Schedule mailing list—no obligation.*)

Choice of steels and wall thicknesses—from C-1008 to C-1030 steels and walls from .028" to .250" depending on size and grade of tube. Coated and low alloy high strength steels also available.

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REVERE COPPER AND BRASS INCORPORATED

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Rome Manufacturing Company Division

Box 111, Rome, N. Y.

Will Market Slow Down in June?

Some steelmakers are talking of a slowdown this month. But they may be overly cautious.

From all indications, the month should match May and could very well surpass it.

■ The improvement in steel demand continues this week. Most of the strength is being shown in flat-rolled products (such as automotive sheets, galvanized, and tinplate), and hot-rolled bars. But other products continue to share the gains.

Miscellaneous users, such as farm implement makers, automotive parts suppliers, stampings manufacturers, and forge shops are all continuing at recent levels. And if anything, some are showing increases.

Cautious Approach—While there is some talk of a dropoff in June, most of it seems to come from the East Coast where the recovery still is not as strong as elsewhere. Even so, the industry appears confident that there will be no serious backsliding.

What's happening is that some steel executives who had to eat their optimistic predictions of a year ago are now more conservative in what they say publicly. (For more of the thinking of steel executives, see story on p. 35.)

How Things Look — Actually, these points are evident:

1. The increase in steel output is solid. And it will continue well into next year. Some steel companies are receiving orders at the rate of 72 to 74 pct of capacity.

2. The summer letdown will be less than many people think. Top steel executives now believe the summer months of July and August will not reflect as great a drop as expected only a few weeks ago. And it is possible the summer will only bring a temporary leveling off.

3. The steel inventory situation is now reaching the point where it will be necessary for many steel users to take in more steel than they have done in the past year.

4. Many steel companies are building up semi-finished steel stocks so as to be in a position to continue making fast deliveries.

5. So far, the possibility of increasing steel prices is just talk. If and when changes are made, they will not be across-the-board.

Cheerful Midwest—In all upward swings, business usually comes in at a higher rate than shipments. This is now the case. However, it is more in evidence at companies which sell more to semi-durable rather than durable goods industries.

Midwest mills are the most optimistic. Automotive orders are still coming in. And the industry is expected to continue placing orders through June—despite the fact that it is rapidly moving toward the phase-out period for 1961 production. This will be followed by the annual model changeover.

Auto Plans—An added factor in the auto picture this year is the fact that labor contracts expire at the end of August—just about the time the industry will be ready to swing into production of 1962 cars.

But there is some evidence automakers are already planning to build inventories of steel products, such as bars, which are not affected by storage. This would allow a fast comeback after a strike, if there should be one, or a fast start with the new models.

And to add to strength later in the year, some major changes are expected in 1963 automobiles. This will require sizable tooling programs.

District Steel Production Index
1957-59=100

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	N.A.	108	107	107
Buffalo	N.A.	118	112	107
Pittsburgh	N.A.	93	92	104
Youngstown	N.A.	93	89	70
Cleveland	N.A.	123	116	116
Detroit	N.A.	134	117	105
Chicago	N.A.	113	106	109
Cincinnati	N.A.	116	113	75
St. Louis	N.A.	122	111	100
Southern	N.A.	104	101	83
Western	N.A.	128	124	103
U. S. Index	111.0*	109.3	104.3	100.4

Source: American Iron & Steel Institute — *Estimate

Steel Production, Composite Prices

Production	Last Week	Two Weeks Ago	To Date 1961	To Date 1960
(Net tons, 000, Omitted)	2,490*	2,370	35,502*	51,030
Ingot Index				
(1957-59=100)	111.0*	109.3	88.8*	133.3
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel base (Cents per lb)	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.44	$66.44	$66.44	$66.41
Scrap No. 1 hvy (Gross ton)	$36.83	$36.50	$36.50	$32.50
No. 2. bundles	$24.17	$24.17	$24.17	$21.83

Motor Market Is Now Forming

Generally, the supply and demand picture for electric motors is still the same as 1960.

But some producers believe sales will climb soon. Inquiries are picking up.

DELIVERIES CURRENT: Manufacturers of electric motors say deliveries are current. Many believe an upswing is in the making. But, for now, the supply and demand picture is steady and much the same as 1960.

▪ Makers of electrical motors report little or no change in their supply and demand picture.

In the integral horsepower field, there has been a slight pickup. For large rotating equipment, there is no real change. For all kinds of motors, producers can offer either delivery out of stock or open manufacturing capacity.

The largest motors are available in eight weeks for standard AC models. Big power units for steel mills can be supplied in about 10 months.

Order Surge?—One builder feels there is a lot of business ready to be turned loose. However, he has had no indication of an order surge in the next few weeks. He feels most users have not yet had enough improvement in their own sales to start heavy capital programs. In the past, a decisive recovery has brought increased motor orders fairly quick.

Pricing of large motors is still very competitive. There has been no general increase this year. Large discounts are still being offered on individual jobs.

Orders for integral horsepower motors are a little better. But one dealer says "we're not going around cheering." Standard AC models are available out of stock up to 150 hp. A few individual ratings of larger sizes can be provided on the same basis.

Varying Deliveries—Special purpose motors are being delivered in two-to-eight weeks. Exact delivery time varies with drive systems, mountings and other special requirements.

Prices of integral horsepower motors are still "rather fluid." There was a two-to-three pct increase in prices for small AC models about a month ago. However, most prices are still soft.

"It's hard to know on some jobs where you will find prices," says a marketing man.

Pricing is no worse than it has been. But there has been no firming, either.

Turned Corner—Makers of fractional horsepower motors feel they have turned the corner. In the last three or four weeks, inquiries have picked up for one plant. Production of cooling unit motors is moving up seasonally. The new coin-operated dry cleaners are starting to generate some healthy orders.

The improvement has not been enough to crowd capacity or strengthen pricing. Plants have plenty of open space in their schedules and are aggressively seeking orders. There is not the frantic scramble to keep plants operating that was apparent last year. But prices are still spotty.

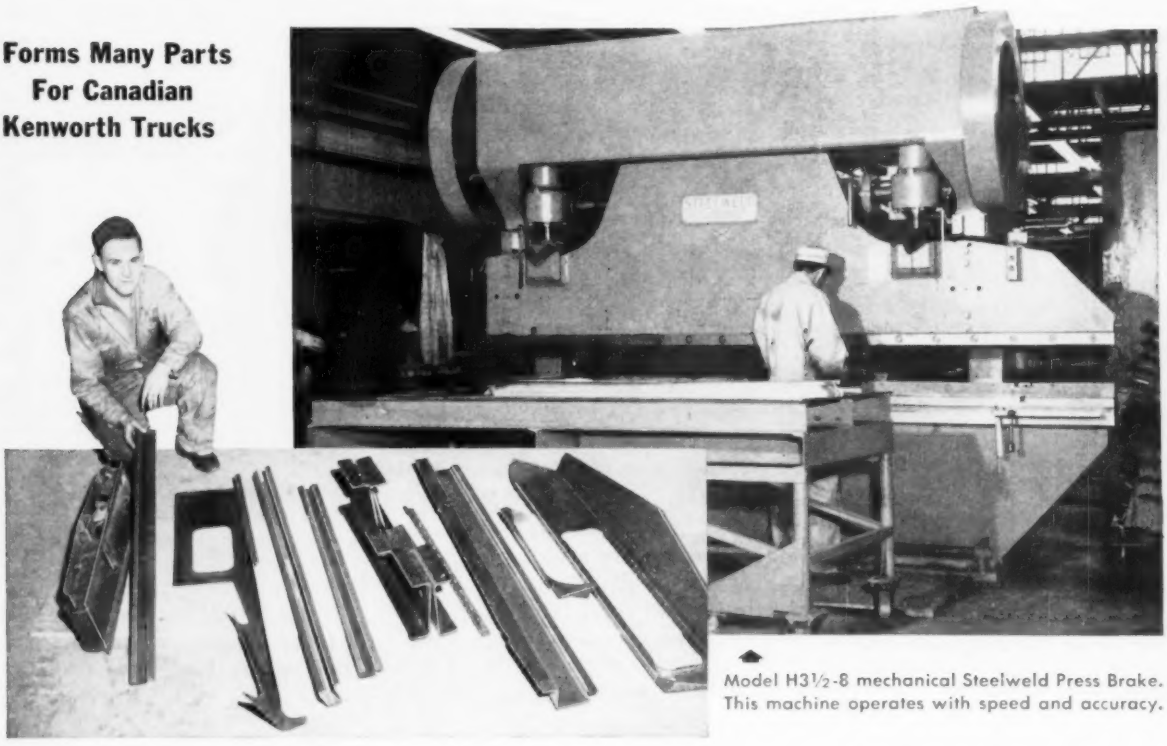
Cost Factor—On desirable orders, suppliers will take a second look at their costs when they run into a lower bid. There have been no general increases this year. Plants are still in a tight squeeze.

Inventories of finished motors are described as good. During the slow period early in the year, stocks were built in order to keep lines going. However, there is too much variation in customer requirements to permit delivery out of stock on many orders.

Canadian Kenworth model K925
C.O.E. tilt cab with sleeper.

TRUCK PRODUCTION KEEPS STEELWELD PRESS BRAKE BUSY

Forms Many Parts For Canadian Kenworth Trucks



Model H3½-8 mechanical Steelweld Press Brake. This machine operates with speed and accuracy.

A great amount of steel is formed into a variety of shapes on a mechanically-operated Steelweld Press Brake in the modern truck plant of Canadian Kenworth, Ltd., Vancouver, B. C.

Kenworth trucks are custom built to each customer's requirements and are widely used in Canada, the United States, and in many parts of the world where an extra rugged vehicle is required to give satisfactory service.

Since the trucks are made individually, or in small lots, it follows that parts for them are made up in correspondingly small numbers. The Steelweld brake has been found outstanding for this work because of the ease and convenience of the control and gauging devices which permit quick die changes. The bed and ram extension adds to its flexibility of use.

The Steelweld brake, and also a Steelweld shear, have been in continuous satisfactory service since 1955 when the Vancouver plant was put into operation.

Write for free booklet No. 2023

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Mechanical and Hydraulic
PRESS BRAKES

Steelweld Machinery includes: Mechanical & Hydraulic Shears and Press Brakes, One-, Two- and Four-Point Straight-Side Presses, Speed-Draw Presses.

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How Much Comeback For Structurals?

In the last three months bookings and shipments of fabricated structurals have been improving.

But the market still lacks overall strength with few signs for a sharp sales upturn during the rest of '61.

▪ How much will structural sales strengthen during the rest of 1961?

This is a question even the producers find hard to answer. So far this year the market has only been fair. Orders improved in the spring, and mills, especially in the Midwest, are busier.

But in most markets deliveries are still rapid. Even in the Chicago area, standard shapes are available in 4 to 5 weeks.

Fabricated Bookings Up—What's happening in fabricated structurals indicates the state of the market. April bookings for fabricated shapes were up 5 pct over March, the American Institute of Steel Construction reports.

But the 309,000 tons booked this April was 20 pct below the 385,000 tons placed in April, 1960. Total tonnage booked through the first four months this year was 13 pct below last year's level.

What's Ahead?—Shipments tell the same story. They have risen since February but, based on totals for the first four months, are trailing 1960 by 1 pct.

What can be expected in the rest of 1961? Construction will continue pacing structural demand. But more large-scale building projects will be needed to give the market a lift. Increased spending by the government (as requested by the President) could help.

Structural producers are staying optimistic. But, as of now, they don't see too many signs that 1961 sales for their products will set any records.

Sheet and Strip—June orders will equal May for many sheet and strip mills. Others expect the month to be a shade below May. **East Coast** mills are still quoting fast delivery on carbon sheet products. Specialty sheets, galvanized and tinplate are much stronger.

Mills at **Pittsburgh** are accepting July bookings on galvanized sheet. But in some cases (usually where standard sizes are wanted) the buyer can still get immediate delivery out of finished stocks. This applies to about 15 to 20 pct of the orders.

Auto sheet buying has pepped up July orders for **Cleveland** area mills. Appliance makers, stampers and others are also buying, but in smaller quantities.

Detroit mills say steel orders for 1961 model autos aren't all in yet. In fact some auto accounts are still more interested in May and June deliveries for current production.

Bar—The sales outlook varies, depending on the area involved. **Pittsburgh** and **East Coast** mills are finding the market dull. Deliveries haven't stretched out very much. There is still plenty of open space on most mill schedules. However, advance ordering has improved a little. June orders are running on a par with May.

In the **Northeast Ohio** market, however, bars are about the liveliest steel product. Bar mills there are operating about 70 pct of capacity. Releases from auto forgers are helping, but bulk of the improvement is across the board.

Plate—Buying is slow on the **East Coast.** Although official deliveries are quoted at 2 to 3 weeks if a buyer demands rush delivery, he gets it.

But in the **Midwest,** more linepipe orders are helping push up plate mill operations. Some plate mills there are running 18 turns or more, with deliveries extending. Warehouses have increased their plate orders with mills.

Stainless Tube and Pipe—Carpenter Steel Co.'s Alloy Tube Div. is now marketing extruded seamless stainless steel tubing and pipe. The products are available for shipment from the division's mill warehouse at Union, N. J. and from branch warehouses and distributors throughout the U. S.

Wire—With user inventories low, some buyers are showing more interest in ordering. Wiremakers are operating at about 65 pct of capacity with an increase expected in June. Welded wire fabric is picking up steam. But construction delays have slowed down the market to a degree. **Midwest** mills are moving at a faster pace, especially in merchant products. Manufacturers wire, although slower, is also making gains. Even barbed wire, which has long been dormant, is in greater demand.

Merchant products are hitting a hot pace in the **Midwest,** but are dull along the **East Coast.** Sales gains at **Chicago** are stretching deliveries at smaller mills.

PURCHASING AGENT'S CHECKLIST

Steelmakers expect upturn to continue into next year, but unsolved problems remain. P. 35

As galvanized sheet market grows, producers step up output, improve products. P. 40

Program of quick reaction aids in fast development of new products. P. 47

COMPARISON OF PRICES

(Effective May 29, 1961)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	May 29 1961	May 22 1961	May 1 1961	May 31 1960
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	14.10
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plates (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	46.75
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 10 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	May 29 1961	May 22 1961	May 1 1961	May 31 1960
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.68	$70.68	$70.68	$70.57
Foundry, South Cin'ti.	71.92	71.92	71.92	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.11	70.11	70.11	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese 74-76 pct Mn. cents per lb.‡	11.00	11.00	11.00	11.00
Pig Iron Composite: (per gross ton)				
Pig iron	$66.44	$66.44	$66.44	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$35.50*	$34.50	$34.50	$33.50
No. 1 steel, Phila. area	39.50	39.50	39.50	34.50
No. 1 steel, Chicago	35.50	35.50	35.50	29.50
No. 1 bundles, Detroit	34.50*	33.50	33.50	27.50
Low phos. Youngstown	40.50*	39.50	37.50	35.50
No. 1 mach'y cast, Pittsburgh	45.50	45.50	45.50	49.50
No. 1 mach'y cast, Phila.	49.50	49.50	49.50	51.50
No. 1 mach'y cast, Chicago	47.50	47.50	47.50	49.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$36.83*	$36.50	$36.50	$32.50
No. 2 bundles	24.17	24.17	24.17	21.83
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.75-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	31.00	31.00	29.00	33.00
Copper, Lake, Conn.	31.00	31.00	29.00	33.00
Tin, Straits, N. Y.	111.125‡	110.25	107.75	100.125
Zinc, East St. Louis	11.50	11.50	11.50	13.00
Lead, St. Louis	11.00	11.00	11.00	11.80
Aluminum, ingot	26.00	26.00	26.00	28.10
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

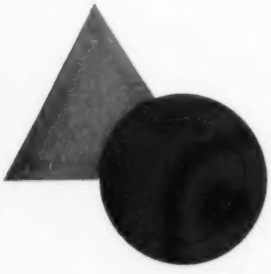
Weighted index on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.



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ATLAS STEELS

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Lists Lead New Upward Surge

The market made a definite upward move this week. Auto and industrial lists lead the way.

East Coast markets have been slow. But optimism is still noted.

■ The scrap market made a definite move upward this week.

The real gains came in Pittsburgh and the Midwest where industrial and auto lists for June climbed above May levels. Though East Coast scrapmen are optimistic, the market has remained quiet in recent weeks. Many, however, anticipate upward moves in the near future.

Another encouraging fact for scrapmen is that steel mill stocks continue to decline. The latest report from the Institute of Scrap Iron and Steel says March brought a mill stock decline for the eighth consecutive month.

The Institute also notes that purchased scrap consumption in March totaled nearly 1.9 million tons—highest total since May, 1960. Figures for April and May aren't available yet. But most scrap observers say further gains will be noted for those months too.

And still another factor in this strengthening market is the Japanese feelers reported in several key areas. The Japanese are expected to make third quarter commitments soon. Some say they will be even larger than those of the second quarter.

The IRON AGE composite price for No. 1 heavy melting is up this week to $36.83. This is the first time this figure has risen in five weeks.

Pittsburgh — The best grades moved up a notch this week as industrial lists confirmed the strength that had been indicated earlier. Local automotive bundles went for about $2 a ton over May prices. This rise brought selective increases in related grades. However, there was no immediate reaction in the form of higher prices or increased demand for No. 2 grades. One mill is holding to a price of $25 for No. 2 bundles. Most local consumers are still out of the market. There is still no word of shipments of scrap out of the district for export.

Chicago—Factory bundle prices advanced as two major industrial lists moved upward. One list totaling more than 10,000 tons brought prices ranging from $39.40 to $39.90 on the track. A second—and larger—list was reportedly in the same price area. One local mill is said to have bid directly. The remainder went to brokers. The entire list held firmly, but did not move up immediately to follow the factory bundle price rise.

Philadelphia—The market is extremely quiet. Reports that area mills would be coming into the market haven't materialized yet. Because of this, domestic business is slow. Export continues at a brisk pace but prices are stable. There are no price changes this week.

New York—Though the general market condition remains unchanged, dealers and brokers seem to have a brighter outlook. One reason for this is the definite pickup in steel operations. Most dealers look for additional scrap buying to come when steel operating rates top 70 pct. This could come soon

Detroit — Early June industrial list buying indicates a rising market. Industrial bundles and busheling show strength. An area mill bought a big part of Chrysler Corp. and Fisher Body Corp. No. 1 bundles. Export bids on early lists failed to land any scrap. Overseas buyers aren't counted on for much pressure in this market. Canada is fairly dormant. But there are reports it might show an interest if prices were lower.

Cleveland—Market is $1 stronger on most grades in the area with room for a modest additional rise. Auto lists went for $1.75 over a month ago. This is equal to a delivered price of $39.50.

Cincinnati — In sympathy with other areas, the market shows some signs of strength. Area mills are expected to be in the market for a month at slightly higher prices.

St. Louis—Latest industrial lists are up $1 to $1.50. The overall market outlook is again one of strength. Mill prices are unchanged, but dealers look for an increase soon.

Birmingham — Some railroad grades climbed $1 per ton this week. But other scrap items remained firm at present levels. There is no local buying in the cast market. But brokers report strength in the cast market outside this area.

Buffalo — The market remains quiet and prices are unchanged. Dealers are anticipating some pickup as mills place June orders.

Boston — Activity is very slow here. This is true for both export and domestic trade.

West Coast—Prices are firm in a strong export market. Japanese commitments for the third quarter are expected in the next few weeks.

Houston—There are indications that an East Texas mill will be coming into the market soon. There is an underlying firmness in the market. The cast market is inactive.

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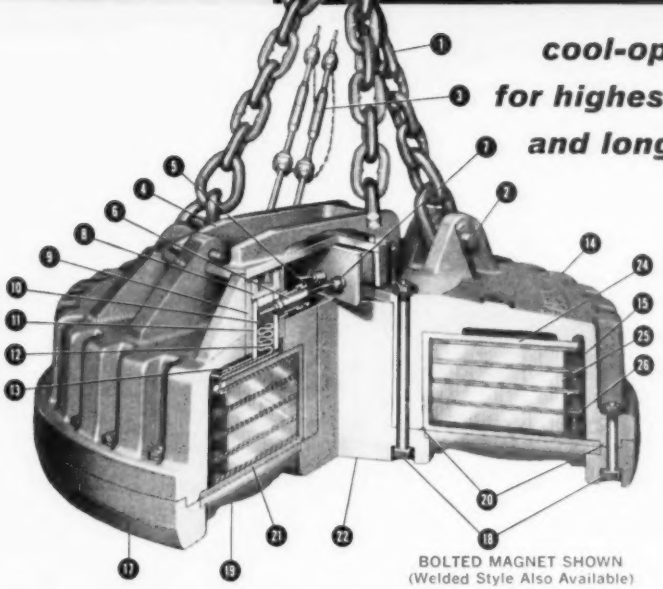

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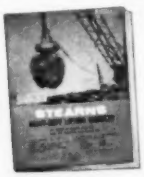

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23. Center pole top-weld provides shock-absorbing strength (welded magnet only)
24. All-welded coil bobbin
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SCRAP PRICES *(Effective May 29, 1961)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	36.00 to 37.00
No. 1 factory bundles	42.00 to 43.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos. punch'gs plate	41.00 to 42.00
Heavy turnings	31.00 to 32.00
No. 1 RR hvy. melting	38.00 to 39.00
Scrap rails, random lgth.	45.00 to 46.00
Rails, 2 ft and under	49.00 to 50.00
RR specialties	41.00 to 42.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	34.00 to 35.00
Stainless	
18-8 bundles and solids	180.00 to 185.00
18-8 turnings	100.00 to 110.00
430 bundles and solids	80.00 to 85.00
410 turnings	55.00 to 60.00

Chicago

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	36.50 to 37.50
No. 1 factory bundles	41.00 to 42.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. forge crops	43.00 to 44.00
Low phos. punch'gs plate, ½ in. and heavier	42.00 to 43.00
Low phos. 2 ft and under	40.00 to 41.00
No. 1 RR hvy. melting	40.00 to 41.00
Scrap rails, random lgth.	46.00 to 47.00
Rerolling rails	57.00 to 58.00
Rails 2 ft and under	49.00 to 50.00
Angles and splice bars	44.00 to 45.00
RR steel car axles	57.00 to 58.00
RR couplers and knuckles	44.00 to 45.00
No. 1 machinery cast.	47.00 to 48.00
Cupola cast.	42.00 to 43.00
Cast iron wheels	34.00 to 35.00
Malleable	46.00 to 47.00
Stove plate	37.00 to 38.00
Steel car wheels	42.00 to 43.00
Stainless	
18-8 bundles and solids	175.00 to 180.00
18-8 turnings	100.00 to 105.00
430 bundles and solids	90.00 to 95.00
430 turnings	50.00 to 55.00

Philadelphia Area

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	40.00 to 42.00
Machine shop turn.	13.00 to 14.00
Mixed bor. short turn.	16.00 to 17.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Clean cast. chem. borings	27.00 to 28.00
Low phos. 5 ft and under	42.00 to 43.00
Low phos. 2 ft punch'gs	44.00 to 45.00
Elec. furnace bundles	42.00 to 43.00
Heavy turnings	27.00 to 28.00
RR specialties	42.00 to 43.00
Rails, 18 in. and under	52.00 to 54.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	39.00 to 40.00
Cast iron car wheels	40.50 to 41.50
Malleable	48.00 to 49.00
No. 1 machinery cast.	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	27.50 to 28.50
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	12.00 to 13.00
Low phos. 18 in. and under	37.00 to 38.00
Rails, random length	41.00 to 42.00
Rails, 18 in. and under	46.00 to 47.00
No. 1 cupola cast.	34.00 to 35.00
Heavy breakable cast.	28.00 to 29.00
Drop broken cast.	45.00 to 46.00

Youngstown

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	27.50 to 28.50
No. 1 dealer bundles	38.00 to 39.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Low phos. plate	40.00 to 41.00

Cleveland

No. 1 hvy. melting	$34.50 to $35.50
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	34.50 to 35.50
No. 1 factory bundles	38.50 to 39.50
No. 2 bundles	22.50 to 23.50
No. 1 busheling	34.50 to 35.50
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut structural & plates, 2 ft & under	38.00 to 39.00
Low phos. punch'gs plate	35.50 to 36.50
Drop forge flashings	34.50 to 35.50
Foundry steel, 2 ft & under	33.00 to 34.00
No. 1 RR hvy. melting	37.00 to 38.00
Rails 2 ft and under	49.00 to 50.00
Rails 18 in. and under	49.00 to 50.00
Steel axle turnings	27.00 to 28.00
Railroad cast.	48.00 to 49.00
No. 1 machinery cast.	48.00 to 49.00
Stove plate	39.00 to 40.00
Malleable	51.00 to 52.00
Stainless	
18-8 bundles	170.00 to 175.00
18-8 turnings	100.00 to 105.00
430 bundles	85.00 to 90.00

Buffalo

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 busheling	31.00 to 32.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	15.00 to 16.00
Low phos. plate	37.00 to 38.00
Structurals and plate, 2 ft and under	39.00 to 40.00
Scrap rails, random lgth.	38.00 to 39.00
Rails 2 ft and under	48.00 to 49.00
No. 1 machinery cast.	44.00 to 45.00
No. 1 cupola cast.	38.00 to 39.00

St. Louis

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	28.00 to 29.00
Foundry steel, 2 ft	31.00 to 32.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	12.50 to 13.50
Shoveling turnings	14.50 to 15.50
Cast iron borings	21.00 to 22.00
No. 1 RR hvy. melting	36.00 to 37.00
Rails, random lengths	39.00 to 40.00
Rails, 18 in. and under	43.00 to 44.00
RR specialties	39.00 to 40.00
Cupola cast.	38.00 to 39.00
Heavy breakable cast.	32.00 to 33.00
Stove plate	32.00 to 33.00
Cast iron car wheels	34.00 to 35.00
Rerolling rails	54.00 to 55.00
Unstripped motor blocks	34.00 to 35.00

Birmingham

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	10.00 to 11.00
Electric furnace bundles	35.00 to 36.00
Elec. furnace, 3 ft & under	34.00 to 35.00
Bar crops and plate	43.00 to 44.00
Structural and plate, 2 ft	42.00 to 43.00
No. 1 RR hvy. melting	36.00 to 37.00
Scrap rail, random lgth.	41.00 to 42.00
Rails, 18 in. and under	46.00 to 47.00
Angles and splice bars	43.00 to 44.00
No. 1 cupola cast.	42.00 to 43.00
Stove plate	42.00 to 43.00
Cast iron car wheels	35.00 to 36.00
Unstripped motor blocks	31.00 to 32.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	24.00 to 25.00
No. 2 dealer bundles	18.00 to 19.00
Machine shop turnings	5.00 to 6.00
Mixed bor. and turn.	5.00 to 6.00
Shoveling turnings	7.00 to 8.00
Clean cast. chem. borings	20.00 to 21.00
No. 1 machinery cast.	38.00 to 39.00
Mixed yard cast.	34.00 to 35.00
Heavy breakable cast.	32.00 to 33.00
Stainless	
18-8 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	70.00 to 75.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	31.00 to 32.00
Drop forge flashings	30.00 to 31.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	12.00 to 13.00
Heavy breakable cast.	28.00 to 29.00
Mixed cupola cast.	31.00 to 32.00
Automotive cast.	40.00 to 41.00
Stainless	
18-8 bundles and solids	170.00 to 175.00
18-8 turnings	70.00 to 75.00
430 bundles and solids	70.00 to 75.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.50 to $30.50
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	4.00 to 4.50
Shoveling turnings	8.50 to 9.00
Clean cast. chem. borings	15.50 to 16.50
No. 1 machinery cast.	39.00 to 40.00
Mixed cupola cast.	32.00 to 32.50
Heavy breakable cast.	28.00 to 28.50

San Francisco

No. 1 hvy. melting	$41.00
No. 2 hvy. melting	38.00
No. 1 dealer bundles	28.00
No. 2 bundles	25.00
Machine shop turn.	15.00
Cast iron borings	15.00
No. 1 cupola cast.	$45.00 to 46.00

Los Angeles

No. 1 hvy. melting	$40.00
No. 2 hvy. melting	37.00
No. 1 dealer bundles	29.00
No. 2 bundles	$25.00 to $26.00
Machine shop turn.	15.00
Shoveling turnings	15.00
Cast iron borings	15.00
Elec. furnace 1 ft and under (foundry)	48.00 to 50.00
No. 1 cupola cast.	46.00

Seattle

No. 1 hvy. melting	$42.00
No. 2 hvy. melting	38.00
No. 2 bundles	25.00
No. 1 cupola cast.	36.00
Mixed yard cast.	31.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:

No. 1 hvy. melting	$31.00
No. 2 hvy. melting cut 3 ft and under	28.00
No. 1 dealer bundles	31.00
No. 2 bundles	21.00
Mixed steel scrap	23.00
Bush., new fact., prep'd	31.00
Bush., new fact., unprep'd.	25.00
Machine shop turn.	8.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	32.00

Houston

Brokers buying prices per gross ton on cars:

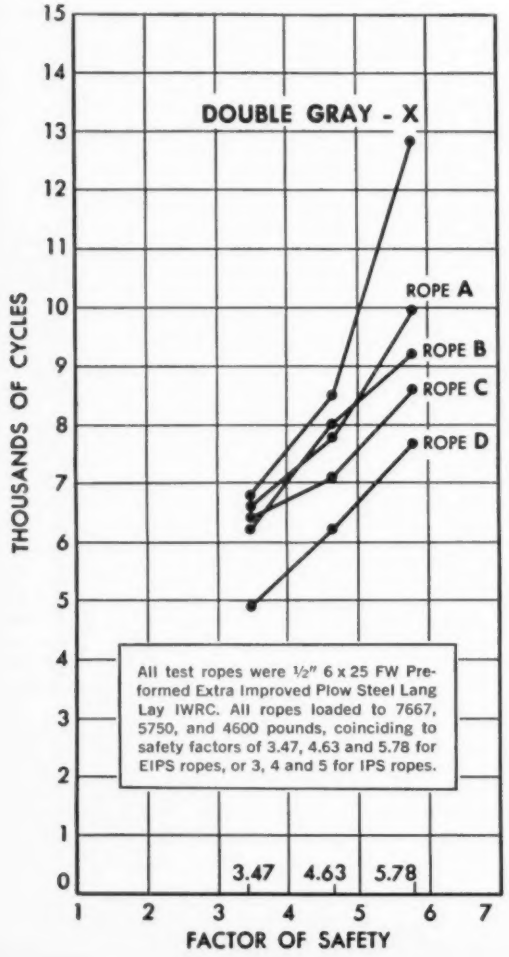
No. 1 hvy. melting	$35.00
No. 2 hvy. melting	31.00
No. 2 bundles	24.00
Machine shop turn.	8.00
Shoveling turnings	11.00
Cut structural plate 2 ft & under	$45.00 to 46.00
Unstripped motor blocks	29.00 to 30.00
Cupola cast.	35.00 to 36.00
Heavy breakable cast.	29.00 to 30.00

DOUBLE GRAY-X® lasts longer

Tests prove CF&I-Wickwire's premium wire rope has 45%* more bending life than average of other ropes tested

In an extended series of tests conducted at CF&I's Palmer Plant, five brands of wire rope were tested to destruction on a 25,000-pound fatigue machine that bends wire rope back and forth over sheaves until it breaks.

All the ropes tested were made by major manufacturers, and were identical in size and specification. And all exceeded the catalog-breaking strength of extra-improved plow steel rope. But, as the chart indicates, one rope outlasted all the others at every safety factor used in the test. That rope was Double Gray-X!


DOUBLE GRAY - X
ROPE A
ROPE B
ROPE C
ROPE D
THOUSANDS OF CYCLES
FACTOR OF SAFETY
3.47
4.63
5.78
All test ropes were ½" 6 x 25 FW Preformed Extra Improved Plow Steel Lang Lay IWRC. All ropes loaded to 7667, 5750, and 4600 pounds, coinciding to safety factors of 3.47, 4.63 and 5.78 for EIPS ropes, or 3, 4 and 5 for IPS ropes.

At the highest and most commonly-used safety factor, CF&I-Wickwire's premium wire rope lasted 30% longer than the rope that survived next longest, and 68% longer than the rope that lasted the shortest length of time. Double Gray-X lasted 45% longer than the average of all other ropes tested at this safety factor.

Double Gray-X has greater resistance to bending fatigue, the chief enemy of wire rope life, because it is the result of a breakthrough in wire-drawing technology. The use of molybdenum disulphide in the drawing process produces these outstanding fatigue-resistance factors:

- A Molecular Shield . . . which prevents the wires from grinding together as the rope operates.
- Smoother Wire Surfaces . . . providing better resistance to fatigue.
- Extra Toughness . . . because molybdenum disulphide helps preserve the inherent toughness of the wire during drawing.

Double Gray-X can save you money because it lasts longer on even the most punishing jobs, as proved by these tests and by field reports from satisfied users. This longer-lasting wire rope cuts repair and replacement costs, lowers your total wire rope investment and reduces machine downtime. Use the wire rope of *tomorrow* today! Ask your CF&I salesman for complete details.

*Percentage above average of all other wire ropes tested at safety factor of 5.78.

The Colorado Fuel and Iron Corporation
Denver • Oakland • New York
Sales Offices in All Key Cities

Higher Copper Price Resisted by Buyers

Little copper is moving at the higher 31¢ per lb price.

With sound inventories, buyers are resisting the latest price increase. Dealers don't think this will last long.

■ At the beginning of the week, copper was being officially quoted at 31¢ per lb. But actually, little was moving at this price.

Two of the three major custom smelters are selling June copper at the average price for the month. And the third is quoting no price or method of pricing at all. There are reports that this smelter is getting slight premiums.

Producers are continuing to do good business—for the shipment price.

Buyers Shy—Dealers and traders are quoting higher than 31¢ per lb, in most cases 32¢ to 33¢ per lb. Buyers are shying away from this metal. There have been some sales, however, when they need metal fast.

The situation stacks up this way: Buyers have stocked up in the last few months and are trying to resist higher prices. But the market is extremely sensitive. Any run of news, good or bad, could change the feeling overnight.

Poor Resistance — Some sellers don't think buyers have enough confidence in their inventories or the state of the market to resist very much or very long.

One dealer believes the copper price will go higher within a week or so. Another looks further ahead. He says the copper price will level off in September at a higher price than now.

Chief Factors—Here are the major factors the market is watching, and their likely effect:

Scrap prices, raw material of the custom smelters, have shown some recent signs of weakness. But export demand seems to be holding up reasonably well. And prices are still inside the 5½¢ spread smelters say they must get for their primary metal, over the cost of scrap, to turn a profit.

Any further weakness will help strengthen consumer buying backbones. But more strength in scrap prices is a sharp upward pressure on the primary price.

Braden Strike—The 500-ton-per-day operation of Braden Copper Co., Kennecott's Chilean subsidiary, is struck.

An unofficial spokesman says talks were deadlocked at the beginning of the week. And the government is not expected to step in.

If this strike is settled within a week or so, the market will breathe a little easier. If not, consumers are bound to get a little uneasy.

Two Tangles—Kennecott tangles with both International Union of Mine, Mill and Smelter Workers, and the United Steelworkers this summer.

Few people are making any predictions on chances for a strike yet. But few consumers are likely to take a chance, considering the past history of long and bitter strikes in this industry.

The first concrete signs of any real trouble are likely to prompt more buying.

June Shortage — There is little June copper available from producers and major smelters.

Books will be opening soon for July delivery. And July is the vacation month in brass and wire mills, two of copper's biggest direct markets. Demand for actual consumption is sure to be down.

One thing those predicting higher copper prices soon, and those who say this isn't likely, do agree on: The market is particularly fluid and sensitive. The tone can change quickly.

Aluminum

Aluminum producers have restored distributor discounts on building sheets.

They eliminated the commodity schedule for dump body stock in February. One distributor says building sheet is now being sold on a specification basis. It is available in quantities below the old 30,000 lb minimum. Another says it is still a commodity.

Tin Prices for the Week

May 23—110.75; May 24—110.875; May 25—111.125; May 26—111.125.*

* Estimated.

Primary Prices

(cents per lb.)	current price	last price	date of change
Aluminum Ingot	26.00	24.70	12/17/59
Copper (E)	31.00	30.00	5/16/61
Copper (CS)	31.00	30.00	5/17/61
Copper (L)	31.00	30.00	5/17/61
Lead, St. L.	10.80	11.80	12/13/60
Lead, N. Y.	11.00	12.00	12/13/60
Magnesium Ingot	38.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.80	12/6/56
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	11.50	12.50	1/12/61
Zinc, N. Y.	12.00	13.00	1/12/61

ALUMINUM: 99% Ingot. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. Other primary prices, pg. 113.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.038	.048-.061	.077-.096	.136-.250
1100, 3003	48.4	47.4	46.4	45.4
5052	55.8	53.0	50.8	49.2
6061-0	53.0	50.3	48.4	47.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-5/16	11/32-23/32	3/4-1 1/16	1 3/32-1 1/4
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	56.13	.....	53.61	57.32
Brass, Yellow	49.27	49.56	49.21	53.43
Brass, Low	52.15	52.44	52.09	56.21
Brass, Red	53.17	53.46	53.11	57.23
Brass, Naval	53.94	60.25	47.75	58.10
Muntz Metal	51.94	.....	47.25	.....
Comm. Bz.	54.73	55.02	54.67	58.34
Mang. Bz.	57.71	61.54	51.27	.....
Phos. Bz. 5%	76.97	76.72	77.47	78.90

Free Cutting Brass Rod 34.77

TITANIUM

(Base Prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 32.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $65.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $70.00
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base .... $ 1.31
Cobalt, 97-99% (per lb) .. $1.50 to $ 1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $29.95 to $36.95
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9% dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz. .... $75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $203 to $205
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz. .$24 to $26
Platinum, dollars per troy oz. .$82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 32.00
No. 120 ..... 31.25
No. 123 ..... 30.50
80-10-10 ingot
No. 305 ..... 36.00
No. 315 ..... 33.75
88-10-2 ingot
No. 210 ..... 43.75
No. 215 ..... 40.50
No. 245 ..... 35.75
Yellow ingot
No. 405 ..... 27.50
Manganese bronze
No. 420 ..... 30.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 23.75-24.25
0.60 copper max. 23.50-24.00
Piston alloys (No. 132 type) .. 25.00-26.00
No. 12 alum. (No. 2 grade) ... 21.75-22.25
108 alloy 22.25-22.75
195 alloy 24.75-25.75
13 alloy (0.60 copper max.) ... 23.50-24.00
AXS-679 (1 pct zinc) 22.00-23.00

Steel deoxidizing aluminum notch bar granulated or shot
Grade 1—95-97½% 23.25-24.25
Grade 2—92-95% 22.00-23.00
Grade 3—90-92% 21.00-22.00
Grade 4—85-90% 20.00-21.00

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27	26¼
Yellow brass	20⅜	18½
Red brass	23⅞	23⅛
Comm. bronze	24¾	24
Mang. bronze	19¼	18½
Free cutting rod ends	19½	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 29¾
No. 2 copper wire 27¾
Light copper 25½
*Refining brass 26½
Copper bearing material 25½
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 29¾
No. 2 copper wire 27¾
Light copper 25½
No. 1 composition 25
No. 1 comp. turnings 24½
Hvy yellow brass solids 19
Brass pipe 18
Radiators 20
Aluminum
Mixed old cast. ..... 12½—13
Mixed new clips ..... 14½—15
Mixed turnings, dry ..... 13½—14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 26 —26½
No. 2 copper wire ..... 24½—25
Light copper ..... 22 —22½
Auto radiators (unsweated). 17½—18
No. 1 composition ..... 22 —22½
No. 1 composition turnings .. 21 —21½
Cocks and faucets ..... 18 —18½
Clean heavy yellow brass ... 15 —15½
Brass pipe ..... 18 —18½
New soft brass clippings .... 17¾—18¼
No. 1 brass rod turnings .... 17½—18

Aluminum

Alum. pistons and struts .... 7 — 7½
Aluminum crankcase ..... 9½—10
1100 (2s) aluminum clippings 12¼—12¾
Old sheet and utensils ..... 9½—10
Borings and turnings ..... 4½— 5
Industrial castings ..... 10 —10½
2020 (24s) clippings ..... 11 —11½

Zinc

New zinc clippings ..... 5½— 5¾
Old zinc ..... 3½— 4
Zinc routings ..... 1¾— 2
Old die cast scrap ..... 1¾— 2

Nickel and Monel

Pure nickel clippings 52-54
Clean nickel turnings 40
Nickel anodes 52-54
Nickel rod ends 52-54
New Monel clippings 23-23.50
Clean Monel turnings 16.50-17
Old sheet Monel 22-23
Nickel silver clippings, mixed. 18
Nickel silver turnings, mixed. 15

Lead

Soft scrap lead ..... 7¼— 7¾
Battery plates (dry) ..... 3 —3¼
Batteries, acid free ..... 2 —2¼

Miscellaneous

Block tin ..... 81 —82
No. 1 pewter ..... 61 —62
Auto babbitt ..... 45 —46
Mixed common babbitt ..... 10 —10½
Solder joints ..... 15 —15½
Small foundry type ..... 9 — 9½
Monotype ..... 9¼— 9¾
Lino. and stereotype ..... 8½— 8¾
Electrotype ..... 8 — 8¼
Hand picked type shells .... 5¾— 6¼
Lino and stereo. dross ..... 1¾— 2¼
Electro dross ..... 2½— 3

(Effective May 29, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$93.50 *A2*	$121.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*	8.10 *P2*	5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.425 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3, Y1*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Struthers, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*		5.50 *Y1*			5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, N. Castle, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *B4, M10* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, City, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras.

(Effective May 29, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Thin *0.25* lb. coating in coils
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price 0.75 lb. 0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65¢.		Prices are for 50 lb. base box; for 45 lb. deduct 15¢; for 55 lb. add 15¢; for 60 lb. add 30¢.
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*				$9.10 *U1*	$6.25 *U1*
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	$6.25 *B3*
	Worcester, Mass.									6.70 *A5*			
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Canfield, Ohio			6.875 *R1, R3* 7.50 C19*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	$6.25 *U1, I3*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1*†† *R3*	7.525 *R3, S1*	9.275 *R3*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.125 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	$6.25 *U1*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	$6.40 *W5*** $6.25 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*		6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.40 *T2*	$9.10 *T2*	$6.25 *T2*
	Houston, Texas									6.65 *S2*			

Holloware Enameling
29 ga. 7.85 *U1* at Gary; Pittsburgh; *J3* at Aliquippa; *W5* at Yorkville; *Y1* at Indiana Harbor; *W5* at Wheeling; 7.95 *G2* at Granite City.

* Electrogalvanized sheets. ** For 55 lb.; for 60 lb. add 15¢.

†† 7.425 at Sharon; Niles is 7.225.

(Effective May 29, 1961)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *P2*	6.375 *P2*	7.50 *P2*	7.95 *P2*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Steelton, Pa.		5.675 *B3*									
	Fairless, Pa.	5.825 *U1*	5.825 *U1*									
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8B5H2* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8, H2* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, Y1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*				7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.725 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.675 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*		7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga. Jacksonville, Fla.	5.875 *A8*	5.00 *A8*									8.00 *A8* 8.35 *M4*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas, Sand Springs, Okla.	5.925 *S2*	5.675 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher.

(Effective May 29, 1961)

* Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
B9 Barry Universal Corp., Detroit, Mich.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.
C19 Canfield Steel Co., Canfield, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.

H1 Hanna Furnace Corp., Detroit
H2 Hercules Drawn Steel Corp., Toledo, O.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., of Pa., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore	$.10	7.87	9.71	10.16	11.35	9.70	9.95	8.65	11.80	17.48	16.48	21.58	20.83
Birmingham		8.46	10.20	10.59	9.45	8.41	8.47	8.26	13.14	16.76	16.65	.....	.....
Boston**	.10	10.00	11.20	11.87	12.50	9.95	10.60	10.15	13.45	17.79	16.79	21.89	21.14
Buffalo	.15	8.70	9.45	11.40	11.15	8.80	9.30	8.90	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	9.37	10.35	10.85	11.54	9.21	9.72	9.37	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.53	10.41	10.90	11.86	9.59	10.29	9.48	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	9.37[1]	10.81	11.07	11.66	9.45	10.11	9.69	11.40	17.21	16.21	21.31	20.56
Denver		11.55	12.53	13.03	13.72	11.39	11.90	11.55	12.98	.....	.....	.....	20.84
Detroit**	.15	9.63	10.61	11.20	11.91	9.58	10.29	9.68	11.16	17.38	16.38	21.48	20.73
Houston**		10.17	10.98	11.35[3]	11.73	9.41	9.81	9.58	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	10.53	11.37	10.95	12.70	10.39	10.91	10.55	11.72	17.17	15.87	21.87	21.12
Los Angeles		10.35[1]	11.20	12.20	12.40	10.30	10.45	10.25	14.20	18.30	17.35	22.90	22.20
Memphis	.15	9.13	10.50	10.95	11.44	9.47	9.82	8.97	12.89	.....	.....	.....	.....
Milwaukee**	.15	9.51	10.49	10.99	11.68	9.35	9.94	9.51	11.04	17.24	16.24	21.24	20.49
New York	.10	9.77	10.23	11.45	11.56	9.61	10.30	9.84	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	9.90	10.10	10.76	11.35	9.70	9.95	9.75	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	9.37	10.81	11.83	11.64	9.21	9.72	9.37	11.40	17.10	16.10	21.20	20.45
Portland		9.45	11.30	12.35	12.40	10.55	11.00	9.45	16.65	18.60	17.85	22.70	22.15
San Francisco	.10	10.27	11.79[2]	11.95	11.88	10.48	10.59	10.17	15.20	18.30	17.35	22.90	22.20
Seattle		11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.85	22.70	22.15
Spokane	.15	11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.35	17.75	17.95	21.58	22.30
St. Louis**	.15	9.57	10.75	11.23	11.74	9.43	9.95	9.59	11.43	17.48	16.48	21.58	20.83
St. Paul	.15	9.72	10.39	11.54	11.89	9.56	10.07	9.72	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars, 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **These cities are on order quantity pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4617—1⅜" to 2⅝"; cold drawn—15/16" to 2⅝" round; Hot-rolled 4140—⅝" to 2⅝" round, cold drawn—15/16" to 2⅝" round.

†† 1⅜ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective May 29, 1961)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	71.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel.

Add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, Toledo, *I4*, $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct; 13 to 13.5 pct; 13.5 to 14 pct, add $1. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container)	Pct
Plain finish—packaged and bulk	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container)	Pct
Plain finish—packaged and bulk	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)	
Plain finish—packaged and bulk	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Price on application assembled to bolts.)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	25.00	28.25	26.00	29.50	32.00	29.50	47.50	38.00	46.50	—	19.25–21.50	—	19.75–21.75
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	29.25	29.25–26.75	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	35.00	35.00–31.50	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25–31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	33.25	33.25–29.75	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
	Col	Col	Col	Col	Col		
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****‡	173	190	...	...	190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	...	...	.....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	...	...	.....	9.00	9.55
Chicago *W7*	173	.....	...	...	.....	9.00	9.55†
Cleveland *A6*	.....	.....	...	...	.....	.....	.....
Cleveland *A5*	.....	.....	...	...	.....	9.00	.....
Crawf'dav. *M4***	175	192	...	214	198	9.10	9.80
Donora Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	...	...	.....	.....	.....
Houston *S2**	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	175	192	...	214	198	9.10	9.80††
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	...	...	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass *W6*	.....	.....	...	...	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.95	10.50
Rankin Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	.....	.....	...	236	.....	9.95	10.50
SparrowsPt. *B3***	175	.....	...	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	...	...	.....	8.65	9.20
Worcester *A5*	179	.....	...	...	.....	9.30	9.85
Williamsport *S5*	.....	.....	...	...	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only. †† 0.115¢ zinc.

(Effective May 29, 1961)

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

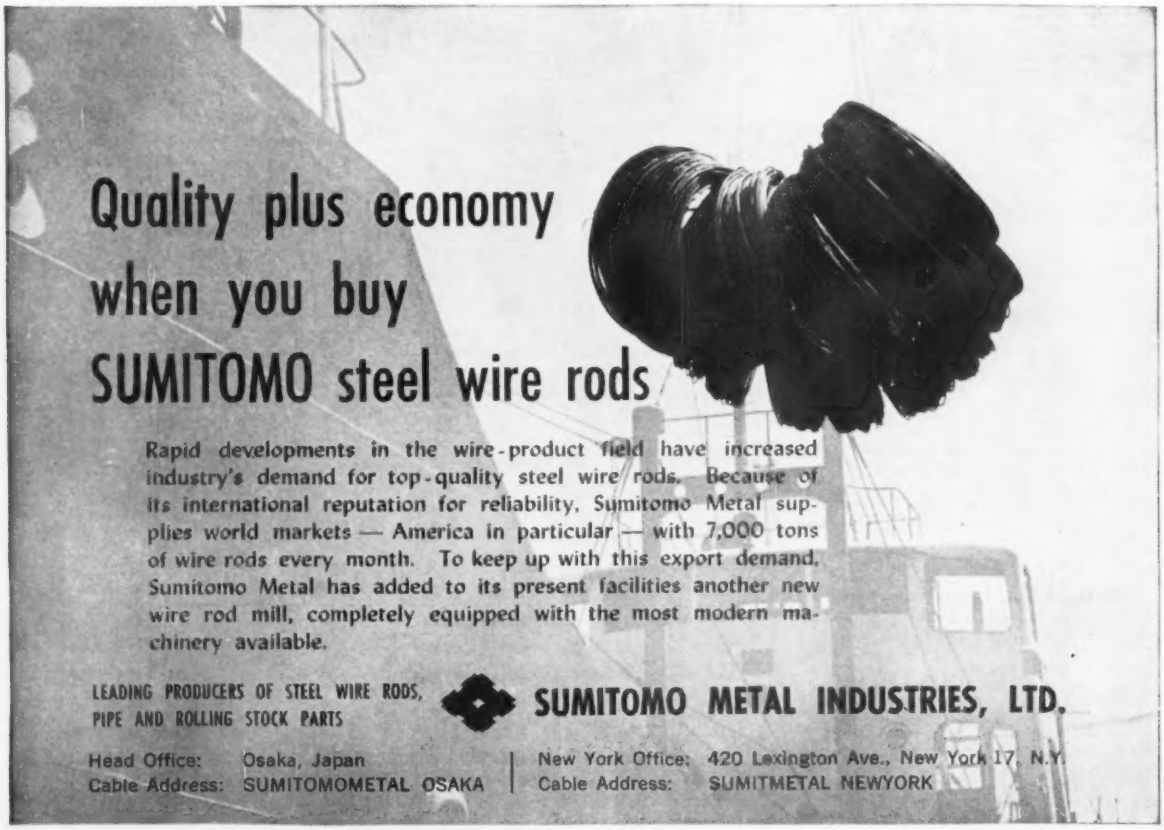
CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

	Net-Ton
Furnace, beehive (f.o.b.)	
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75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when you buy
SUMITOMO steel wire rods
Rapid developments in the wire-product field have increased industry's demand for top-quality steel wire rods. Because of its international reputation for reliability, Sumitomo Metal supplies world markets — America in particular — with 7,000 tons of wire rods every month. To keep up with this export demand, Sumitomo Metal has added to its present facilities another new wire rod mill, completely equipped with the most modern machinery available.
LEADING PRODUCERS OF STEEL WIRE RODS, PIPE AND ROLLING STOCK PARTS
SUMITOMO METAL INDUSTRIES, LTD.
Head Office: Osaka, Japan
Cable Address: SUMITOMOMETAL OSAKA
New York Office: 420 Lexington Ave., New York 17, N.Y.
Cable Address: SUMITMETAL NEWYORK

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25			
Cleveland *R5*						15.35
So. Chicago *R5*				10.10		
Ensley *T2*	5.75	6.725				
Fairfield *T2*		6.725		10.10	6.875	
Gary *U1*	5.75				6.875	
Huntington, *C16*		6.725				
Ind. Harbor *I3*				10.10		
Johnstown *B5*		6.725				
Joliet *U1*			7.25			
Kansas City *S2*				10.10		15.35
Lackawanna *B5*	5.75	6.725	7.25		6.875	
Lebanon *B5*			7.25			15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*						15.35
Pittsburgh *J3*				10.10		
Seattle *B2*					7.025	15.85
Steelton *B5*	5.75		7.25		6.875	
Struthers *Y1*				10.10		
Torrance *C7*					6.75	
Williamsport *S5*		6.725				
Youngstown *R5*				10.10		

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	9.10				
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*		10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70		
Detroit *D1*	9.05	10.50	12.70	15.70	
Detroit *D2*	9.05	10.50	12.70		
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	15.60	
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*			12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	
New Castle, Pa. *M10*	8.95	10.40	12.60	15.60	
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A5*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*		10.70	12.90	16.10	19.30
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper

Rolled elliptical, 18 in. or longer, 5000 lb lots 43.50
Electrodeposited, 5000 lb lots 36.50
OFHC anodes .....41.50 to 44.50
(depending on shape)
Brass, 80-20, ball anodes, 2000 lb or more 50.50
Zinc, ball anodes, 2000 lb lots 18.75
(for elliptical add 1¢ per lb)
Nickel, 99 pct plus, rolled carbon, 5000 lb ..... .945
(Rolled depolarized add 3¢ per lb)
Cadmium, 5000 lb 1.60
Tin, ball anodes $1.26 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum, N. Y.. 65.90
Copper sulphate, 25.2 Cu min, 6000 lbs per cwt, Detroit 17.45
Nickel sulfate, 5000 lbs 29.00
Nickel chloride, freight allowed, 100 lb 45.00
Sodium cyanide, domestic, del'd east of Rockies, 200 lb drums.... 25.80
Zinc cyanide, 100 lb, N. Y. 60.75
Potassium cyanide, 100 lb drum N. Y., del'd east of Rockies..... 46.50
Chromic acid, flake type, 10,000 lb or more, N. Y. 30.44

METAL POWDERS

(Cents per lb, f.o.b. shipping point for ton lots or over, except as noted)

Iron Powders

Molding grade, domestic and foreign, 98 pct Fe, 100 mesh bags, freight allowed east of Miss. R. 11.50
Electrolytic Iron, melting stock, 99.87 pct Fe, truckload lots 25.75
Carbonyl Iron (200 lb lots) 88.00
Welding Grades 8.10
Cutting and Scarfing Grades 9.85
Hydrogen reduced, domestic 11.25

Copper Powders

Molding Grades
Electrolytic, domestic, f.o.b. shipping point. 15.00†
Atomized ..... 44.3 to 62.3
Reduced ..... 15.00†
Chemically Precipitated 44.5
Brass, 5000-lb lots ..... 33.1 to 50.3
Bronze, 5000-lb lots ..... 51.0 to 55.8
Chromium, electrolytic 5.00
Lead ..... 7.50†
Manganese, electrolytic ... $1.00
Molybdenum .....$3.60 to $4.35
Nickel $1.15
Carbonyl Nickel, 20,000 lb lots $1.01
Nickel-Silver, 5000 lb lots.. 54.7 to 67.3
Silicon 70.00
Solder ..... 7.00†
Stainless Steel, 316 ..... $1.07
Stainless steel 304 ..... 89.00
Tin ..... 14.00†
Titanium, 99.25 + pct, per lb, f.o.b. $11.25
Tungsten, carbide grades... $3.25
Zinc ..... 19.5 to 27.5

† Plus cost of metal.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field		9.875	
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor		12.475	
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30		
		Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

CLAD STEEL

Base prices, cents per lb f.o.b.

Cladding	Plate (*L4, P2, A3, J2*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type 302				37.50
304	28.80	31.55	34.30	40.00
316	42.20	46.25	50.25	58.75
321	34.50	37.75	41.05	47.25
347	40.80	44.65	48.55	57.00
405	24.60	26.90	29.25	.....
410	22.70	24.85	27.00	.....
430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, $43.85; 1 side, $36.60.

(Effective May 29, 1961)

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.... $185.00
High duty (except Salina, Pa., add $5.00) 133.00
Medium duty 125.00
Low duty (except Salina, Pa., add $2.00) 103.00
Ground fire clay, net ton, bulk... 22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala. $158.00
Childs, Hays 163.00
Chicago District 168.00
Western Utah 183.00
California 185.00
Super Duty
Hays, Pa., Athens, Tex., Windham, Warren, O. 163.00-168.00
Silica cement, net ton, bulk, Chicago 26.75
Silica cement, net ton, bulk, Ensley, Ala. 27.75
Silica cement, net ton, bulk, Mt. Union, Pa. 25.75
Silica cement, net ton, bulk, Utah and Calif. 39.00

Chrome Brick

Standard chemically bonded, Baltimore, Md. $620.00
Gary, Ind. 658.50
Standard, Pascagoula, Miss. 647.50
Standard chemically bonded, Curtiner, Calif. 119.00
Burned, Baltimore 585.00

Magnesite Brick

Standard, Baltimore $715.00
Chemically bonded, Baltimore 655.00
Chemically bonded, Pascagoula, Miss. 682.50

Grain Magnesite

St. ⅜ to ½-in. grains
Per net ton

Domestic, f.o.b. Baltimore in bulk. $73.00
Domestic, f.o.b., Pascagoula, Miss... 80.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.
in bulk 46.00
in sacks 52.00-54.00

Dead Burned Dolomite

F.o.b. bulk, producing points in:
Pa., W. Va., Ohio $16.75
Missouri Valley 15.60
Midwest 17.00

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100, 110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

BOILER TUBES

5 per 100 ft. carload lots cut 18 to 24 ft. F.o.b. Mill	Size OD-In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox..	2	13	40.28	47.21	35.74
Jones & Laughlin *	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube.....	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel...	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

* Electricweld only.

TubeXperience in action

Wind Velocities to Mach 7 Prove Needle-Size Superior Stainless Tubing

Manometer lines of Superior Type 304 stainless tubing, drawn to needle size, withstand the vibration caused by air speeds beyond Mach 7 and internal pressures as high as 5000 psi in FluiDyne wind-tunnel tests of missile component models. And they have been in some assemblies for 3½ years without cracking, pinholing or buckling.

FluiDyne Engineering Corp., one of the major designers of such test facilities, attributes the long life of this Superior tubing to both its high modulus of elasticity and its resistance to the corrosive effects of mercury and soldering-flux acid.

Ductility is a big advantage, too. This permits the Superior tubing to be easily hand-bent into complex shapes for application in wind tunnels and readout equipment.

Filling stainless steel tubing orders that call for tiny needle tubing in gages from 6 to 33 or tubing with OD's as large as 1.125 in. calls for the resources Superior has to offer. Why not investigate us as a source of small-diameter stainless tubing. Catalog 21 describes the types and analyses available. Also gives tips on its selection and application. Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010 in. to ⅝ in. OD—certain analyses in light walls up to 2½ in. OD

West Coast: Pacific Tube Company, Los Angeles, California • FIRST STEEL TUBE MILL IN THE WEST

CRANES
BOUGHT & SOLD
ENGINEERED TO YOUR REQUIREMENTS
Ornitz Equipment Corp.
Industrial Engineering Service
595 Bergen St. Brooklyn 38, N. Y.
NEvins 8-3566

HARCON-LIPSETT LIQUIDATING
at 201 Rover St., Everett, Mass.
500 TON/DAY BLAST FURNACE
108 KOPPERS COKE OVENS
2 PUSHER MACHINES

CARS
800 Cu. Ft. Larry 14'8" Ga. 230V. DC (2)
65 Ton Hot Metal Std. Ga. w/65 Ton Ladles (4)
50 Ton Slag Std. Ga. w/300 Cu. Ft. Ladles (2)
50 Ton Slag Std. Ga. w/260 Cu. Ft. Ladles (2)
50 Ton Transfer Std. Ga. 230V. DC
10 Ton Quenching Std. Ga. 41'6" Wheelbase

OVERHEAD CRANES 230V. D.C.
110 Ton Cleveland Ladle 48'5" Span
20 Ton Shaw 41'7" Span, Cab Oper.
10 Ton Shaw 52' Span, Cab Oper.
10 Ton Bedford 3/4 Yd. Bucket 61' Span

ELECTRIC BRIDGE 230V. D.C.
Traveling on Rail, 230' Span, plus 80' Cantilever, 6 Ton Bucket, Single Trolley, Motor Driven

MISCELLANEOUS
Penna. HAMMERMILLS SX13 400 HP (3)
Koppers 2 Roll CRUSHER 36"x42" 40 HP
Trimmer CONVEYOR 30"x13'3" c/c Cleated
100 Ton PRINTOMATIC Larry Car SCALE, 14'8" c/c Rail
50 Ton 60' Platform Printomatic TRUCK SCALE
30 Ton 40' Platform Printomatic TRUCK SCALE
CAR HAULS Drum Type 20"x18", 25 HP
SX12 HOIST Lidgerwood 178'
MOTORS, DC Type CO & MD Series & Compound Wound 230V, 1 to 200 HP (100)
MOTORS AC 3/60/440V, Squirrel Cage & Slip Ring 1 to 100 HP (100)

Representative on Premises DUnkirk 9-3390

Write for Catalog

SALES AGENT
HEAT & POWER CO., INC.
60 E. 42 St., N. Y. MUrray Hill 7-5280

3000/4500 TON BLH HIGH SPEED FORGING PRESS NEW 1954
DIAMETER OF RAM 62"
STROKE OF RAM 40"
2—17" DIA PULLBACKS
MOVING DOWN TYPE
WITH INTENSIFIER
SN. S.O.520500-1-2-3
WT. 620,000#
FRACTION OF ORIGINAL COST
POLLOCK INDUSTRIES INC.
S. KEIM ST., POTTSTOWN, PA. FA 3-5500

Car Cutbacks Slow Used Tool Exports

Used machine tool dealers say exports to Europe lag 30 pct behind last year's level.

Total 1961 sales volume will remain respectable. But a cutback in foreign car imports to the U. S. has affected used tool exports.

■ Used machine tool exports to Europe are lagging this year. But they will still attain a respectable volume, according to an industry leader.

Laurens Bros. of Cincinnati says the export business so far in 1961 has run about 30 pct under last year's level. The normal business cycle for the remainder of the year is up, however. Exports should go hand in hand with it.

Compact Cars—What has happened in recent months, according to officials of the company who travel to Europe extensively, is that the American compact cars have drastically cut the market in the U. S. for most small foreign cars. Expansion programs abroad have been eased, resulting in cancelled machine tool orders. Many of these are units like gear cutters which have uses in other industries.

"Deliveries of new machine tools in Europe are still 21 to 18 months officially," says a spokesman.

"However, it is possible to get considerably less. Many auto companies and suppliers who have ordered the machines are more than happy to have delivery postponed. So with a little shopping around, users in Europe can buy machines in their own area without financial restrictions, and at a bargain price.

"In one case, over 100 machine tools on order for one company are being built. But they could be purchased by other customers on a short delivery basis."

Recession Here—A part of last year's spurt in exports of used machinery was due to bargain prices in the U. S. because of the depressed state of business. A revival will tend to work in reverse order, putting used U. S. tools at a greater price disadvantage for export purposes.

Domestic business in the Cincinnati area still lacks zip, according to Laurens Bros., but has moderately improved through the year.

Stock Machines—Two of the better used machine tools in stock at Laurens Bros. are an American "Hole Wizard" radial drill and several Heald Borematics. The radial drill is a 1942 model with a price tag of $4750, compared with about $10,000 for an equivalent new machine. It has a 4 ft 9 in. "almost new" column and a new sleeve.

The Borematics are not too easy to find. These are Model 321's, six years old and carrying a price tag of around $5150, compared with over $20,000 for the equivalent new machine. These have been reconditioned.

Top Guarantees—All are sold under guarantees of the Machinery Dealers National Assn., the most prominent being a 30-day, money-back guarantee if mechanically unsatisfactory.

This group claims as members about half of the 500 or more dealers in the U. S. who stock machines and handle about 80 pct of the used machine tool sales.

CHAIN HOIST SPECIAL

New Elephant Triple Spur-Gear

MADE IN JAPAN

SIZE	PRICE
¼ ton	$ 45.00
½ ton	50.00
1 ton	65.00
1½ ton	90.00
2 ton	100.00
3 ton	145.00
5 ton	225.00
10 ton	380.00

10 Ft. Lift
95% Efficiency

Jet Pullers—Link Chain

SIZE	PRICE
¾ ton	$ 46.50
1½ ton	65.00
3 ton	90.00
4½ ton	160.00
6 ton	190.00

F.O.B. Newburgh
Dealer inquiries invited
Distributor

ORANGE COUNTY MACHY. CO.
323 BROADWAY, NEWBURGH, N.Y.
JO 1-7333

GUARANTEED—RE-NU-BILT

Electric Power Equipment — A. C. Motors

3 phase—60 cycle

SYNCHRONOUS

Qu.	H.P.	Make	Type	Volts	Speed
1	6000	G.E.	ATI. SP.F. 2205/6600		600
1	3500	G.E.	TS 1.0P.F. 4600/2300/4000		360
2	1750	G.E.	ATI	2300	3600
3	500	G.E.	TS 7569	2200	1200
1	400	G.E.	TS 7565	2200	1200
1	325	G.E.	ATI 1.0P.F.	440	1800
3	300	ElMach.	BRKT	2200	1200

SLIP RING

1	1750	G.E.	M-5788	4800	1800
1	800	Whse.	CW	500	1770
1	800	G.E.	MT-428	2300	450
1	600	Whse.	CW 4-32-D-15	440	1778
1	550	Whse.	CW	440	852
1	500	Whse.	CW	550	850
1	300	A.C.	ANY	440/2300	720
1	300	G.E.	MTP-561	2200	1800
1	250	G.E.	IM-16	220/440	875
1	250	Cr.Wh.	Size 29Q	2300	850
1	250	G.E.	MT-424Y	4000	257
1	200	G.E.	IE-13B	220	1800
2	200	Whse.	CW-890	2300	1775
1	200	G.E.	IM	2200	580
1	200	G.E.	IM	440	435
1	125	G.E.	MT-557	220/440	1200
1	125	A.C.	ARY	440	870
3	100	A.C.		440	695
1	100	G.E.	M-6355Z	220/440	580
1	100	Whse.	CW-754C	220/440	900

SQUIRREL CAGE

3	1500	G.E.	K	2200	3580
1	500	G.E.	FT-559AY	2200	3600
1	500	Whse.	CS-1115	2300	863/445
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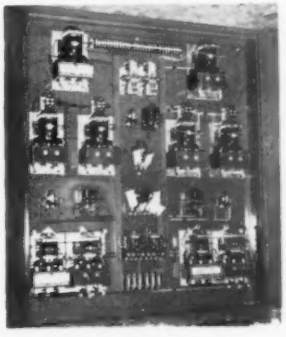

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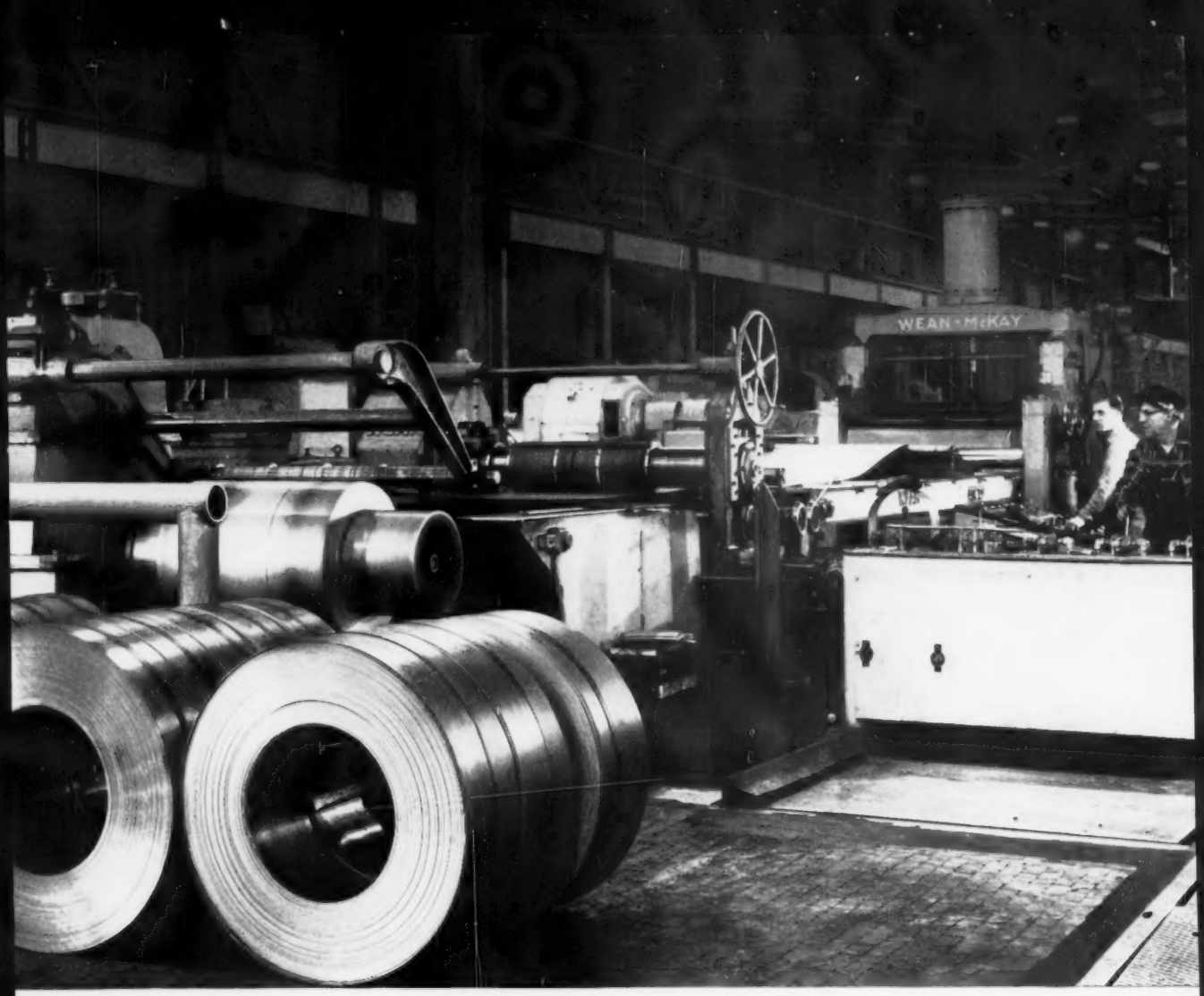

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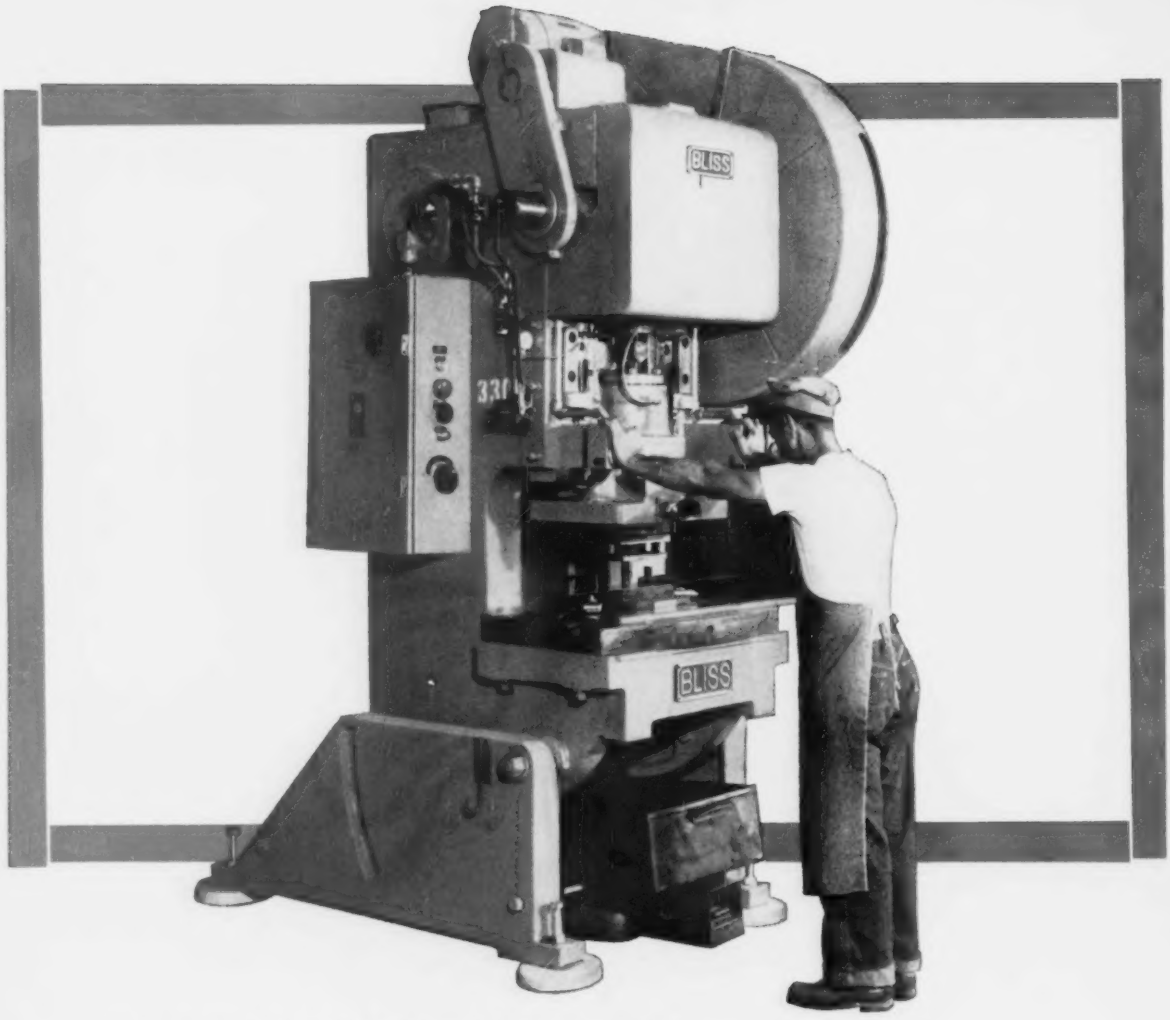

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